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THE
PRINCIPLES AND PRACTICE
OF
OBSTETRICS.

BY
GUNNING S. BEDFORD, A.M., M.D.,
PROFESSOR OF OBSTETRICS, THE DISEASES OF WOMEN AND CHILDREN, AND CLINICAL OBSTETRICIAN, IN
THE UNIVERSITY OF NEW YORK; AUTHOR OF "CLINICAL LECTURES ON THE DISEASES OF
WOMEN AND CHILDREN."

Illustrated by four Colored Lithographic Plates and Ninety-nine Wood Engravings.

Multum restat adhuc operis, multumque restabit, nec ulli nato,
post mille sæcula, præcindetur occasio aliquid adjiciendi.

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To

THE ALUMNI AND STUDENTS,

WHO HAVE ATTENDED

THE AUTHOR'S LECTURES ON OBSTETRICS IN THE UNIVERSITY OF NEW YORK,

AND TO WHOSE UNIFORM COURTESY AND KINDNESS HE IS SO

GREATLY INDEBTED,

This Volume is Affectionately Dedicated.

P R E F A C E .

IN writing a work on the "Principles and Practice of Obstetrics" I have had constantly before me one cardinal object—to be useful. I have endeavored to present to the Profession a practical Book, one which will develop the phenomena of parturition in their various phases as they occur in the Lying-in room. The anatomy of the Pelvis and Genitalia, and their special bearings on Parturition, have been dwelt upon with a minuteness to which they have a just claim. Abortion, the subject of Labor, its Divisions, its Mechanism and Management, its determining cause, together with the forces engaged in the expulsion of the child, the treatment of the puerperal woman and her new-born infant, Flooding both ante-partum and post-partum, Placenta Prævia, Puerperal Fever, Puerperal Mania, Anæsthetics, have all been considered with the fulness their importance demanded. Nor have I neglected the physiological disquisitions necessarily involved in the consideration of the numerous questions connected with Menstruation, Reproduction, Pregnancy, Fœtal Nutrition, Puerperal Convulsions, and other kindred topics.

Manual, Instrumental, and Premature Artificial Delivery have received their share of attention; they have been discussed freely and at length. On the subject of Instruments, I have spoken without reserve, and have not failed to raise my voice, in the most emphatic manner, in rebuke of what I believe to be oftentimes their unnecessary and reckless employment. If what I have said on this point shall exercise an influence in

behalf of suffering woman, in the hour of her need, I shall indeed be happy. Touching the grave questions of Embryotomy and the Cæsarean section I have suffered my mind to be governed by no predilection, but have examined, with the single purpose of reaching the truth, the substantial evidence both for and against these alternatives; my deductions are the results of what I believe to be a thorough and impartial analysis of this evidence.

The arrangement of the work is rigidly systematic; the various subjects following each other in what I conceive to be the proper order of their dependence. In one word, I have had in view the wants of the obstetric student; I have endeavored to aggregate facts, and dispense as far as possible with theoretical discussions. Throughout the work I have maintained strictly a Conservative Midwifery, as I have always done—and shall continue to do—in my oral teachings in the University. It has also been my endeavor to inculcate upon the accoucheur a due reverence for the resources of nature, so that he may not thoughtlessly lapse into that too common error—"Meddlesome Midwifery." Among other things, it has been my special aim to bring the work fully up to the existing state of Obstetric Science in all its varied relations. For this purpose I have diligently consulted the ablest and most recent authors; at the same time, I have not been unmindful of the obligations of our science to the early Fathers. May I presume to hope that the Book, both in its matter and arrangement, will not be unacceptable to the general practitioner, or to the Professor of Obstetrics himself?

In reference to the Illustrations, I have consulted quality rather than quantity, and have in every case endeavored to make them explanatory of some important practical lesson. With this view, I have not hesitated, where it could be done with advantage, to avail myself of the graphic delineations by Maygrier, Moreau, Montgomery, and others. The engravings, representing Forceps delivery, are the Daguerreotypes of my instructions on this subject in the University, and I trust they may convey accurate rules for guidance on this important and interesting part of the Accoucheur's duties.

In order to facilitate the object of the reader, and place promptly within his reach the numerous subjects discussed in the volume, a Table of Contents, and, in addition, a full and carefully prepared Alphabetical Index have been provided. I have also added a list of authors to whom reference has been made, and this will give some indication of the labor expended on the work.

The Book itself embodies ample internal evidence of failure or success in the accomplishment of the objects proposed. If that evidence, under a fair examination, shall lead to the decision that the design has not been carried out, it will be to me a source of the deepest regret. If, on the contrary, it shall be my good fortune to have my efforts approved by the Profession, then I shall be abundantly repaid for my labor, and may, without arrogance, exclaim—" *Nec Ego frustra.*"

In conclusion, I cannot but cherish the hope that if this Volume should fall into the hands of some of my numerous pupils, residing in various portions of this and other countries, it may serve to awaken old associations, and bring back to memory the many happy hours we have spent together in the lecture-hall; and may these words be accepted as proof that their preceptor continues to entertain for them feelings of deep interest and affection.

NEW YORK, 66 FIFTH AVENUE,
Oct. 25, 1861.

PREFACE

TO THE SECOND EDITION.

AN Author can covet no richer compensation for his labors than the endorsement of his Peers. It would, therefore, be affectation in me to attempt to conceal the pleasure I experience in being thus early called upon for a Preface to the Second Edition of the "*Principles and Practice of Obstetrics*." But a little over four months has elapsed since the book was first issued from the Press. In view of the unhappy and disturbed condition of the country, and the consequent derangement of commercial as well as of scientific pursuits, I have, indeed, good cause for self-congratulation ; and I avail myself of this occasion to return my cordial thanks to the Profession for the countenance, which they have so promptly extended to my efforts. The eulogistic notices of the Medical Press—both home and foreign—have imposed upon me an obligation not soon to be forgotten—an obligation I can cancel in no other way than by the pledge, that it shall be my earnest care to endeavor to render myself still more worthy of its good opinion.

The present edition has undergone a thorough revision ; numerous verbal and typographical errors, more or less incident to a first issue, have been corrected. I again submit the work to the Profession, not without hope that it may continue to have awarded to it the seal of their approbation.

March, 1862.

P R E F A C E

TO THE THIRD EDITION.

AGAIN has the grateful duty devolved on me of returning thanks to the Profession for the continued—and I hope I may say without egotism—unexampled patronage extended to the "*Principles and Practice of Obstetrics.*" It is now but thirteen months since the book was first presented to the world, and my Publishers admonish me that a *Third Edition* is called for. To say that its reception is beyond my most sanguine hopes, and that I am deeply impressed with a sense of the obligation imposed by this prompt recognition of my labors, would be but the reiteration of a self-evident truth; and I may add, that both the pleasure and obligation are greatly enhanced by the fact that, in the short period which has elapsed since the work was issued from the Press, it has already been recommended as a Text-Book in nine of our medical colleges. What greater honor can an Author claim at the hands of his Peers—what higher incentive to future effort! These influences, if my life be spared, shall not be lost upon me. Again, also, I have most cordially to thank the Medical Press, here and abroad, for their continued commendatory and flattering notices.

This Edition has been carefully revised and enlarged; besides additions to the Text throughout the volume, it will be seen that a lecture on *Phlegmasia Dolens* has been incorporated.

NEW YORK, 66 Fifth Avenue, Dec. 1862.

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THE

PRINCIPLES AND PRACTICE OF OBSTETRICS.

LECTURE I.

Midwifery an Exact Science—The Passage of the Child through the Maternal Organs is founded on the Principle of Adjustment—The Pelvis; the Position it occupies in the Human Skeleton—Importance of its Position in Childbirth—The Direction of the Pelvis; its Variations—Bones of the Pelvis in the Adult and Fœtus—Sacrum, Coccyx, and the Two Innominata—Anterior Sacral Plexus of Nerves; its Influence in the Production of Numerous Pathological Phenomena—The Os Coccyx; its Importance in Childbirth—Dislocation of the Coccyx—Fracture of the Coccyx—The Spinous Process of the Ischium—How, when malformed, it may interfere with the Process of Delivery.

GENTLEMEN—The science of Midwifery, so far as it relates to the expulsion of the child and its appendages through the maternal organs, is an exact science. Expulsion is both a physiological and mechanical act, and is the product, in part, if I may so term it, of a play of certain physical principles. What, in fact, is a natural delivery, but the operation of a motive-power acting on a body with the view of causing its passage through a given space? This motive-power is the contracting womb; the body is the fœtus; the space consists of the bony pelvis, and the various soft parts directly connected with the parturient effort. But no force which the uterus can bring to bear will enable it to accomplish the delivery of the child, unless there be a proper proportion between the fœtus and the organs through which it has to pass; and, therefore, it may be asserted, that the natural expulsion of the child through the maternal organs is the result of adjustment; or, in other words, of a correspondence between the various portions of the fœtus, and the canal through which it makes its exit.

If this be so—and the further we progress in the investigation of the subject the more convinced will you become of the truth of the proposition—it follows, as a necessary consequence, that the paramount duty of the obstetric student is to study nature, and understand the admirable mechanism she has instituted for the purpose of securing to the child a safe transit through the maternal passages. With a knowledge of this mechanism he will be enabled,

when nature is contravened by circumstances beyond her control, to act as her substitute; and, by judicious interference, to save the lives of both mother and child. Without this knowledge, on the contrary, his interference would be criminal; for it could lead to nothing short of disaster or death. Allow me, then, thus early, to urge upon you a profound respect for nature; her temple is the proper place for the student of midwifery; there it is that she discourses most eloquently, though silently, and the best obstetricians will be those who have worshipped the most zealously at her shrine. Our science is but the portrait of nature, and the fidelity of the picture is commensurate with the skill of the artist.

As preliminary to a proper appreciation of the mechanism of labor, it will be necessary for you to become thoroughly acquainted with the anatomy of the human pelvis, both as regards its bony structure, and the various soft parts directly connected with it.

The fœtus and its annexæ, together with the uterus and its appendages, will also constitute topics for attentive study.

Before commencing a description of the individual bones of the pelvis, it may not be out of place to direct your attention, for the moment, to the position it occupies in the skeleton. It is situated at the inferior extremity of the vertebral column, with which at its posterior and upper surface it articulates, forming, at this point of union, an important projection known as the *sacro-vertebral* prominence, to which we shall have occasion, hereafter, more particularly to allude. The pelvis is supported below by the two femoral bones, the heads of which are respectively received into the acetabula. Thus, it forms the lower boundary of the abdominal cavity, and at the same time affords accommodation to the rectum, the bladder with its excretory duct, the uterus, etc. This position of the pelvis is not without interest, for you cannot but observe the signal

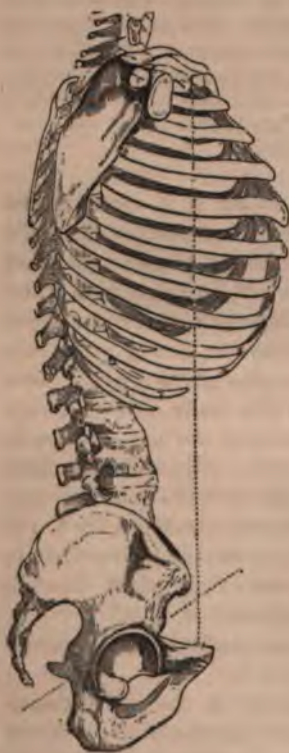


FIG. 1.

advantage it imparts to the parturient woman, in the efforts necessary for the expulsion of the child. In consequence of the two important emunctories or outlets, the bladder and rectum, being

situated within its cavity, nature is enabled, at the time of childbirth, to bring into active exercise, in addition to the contractions of the uterus, the various muscular forces employed in the expulsion of the excrements from the system.

By reference to Fig. 1, it will be seen that the pelvis, in the upright position, presents a marked obliquity to the horizon, forming what is sometimes described as the *inclination* of this canal. The perpendicular line, exhibiting the *axis* of the trunk, instead of passing through the centre of the upper plane or strait, falls on the symphysis pubis, while the line which really represents the centre of the plane, intersects the perpendicular at an acute angle. When it is recollected that the usual position of the female is the erect one, the advantage of this inclination of the pelvis, during the period of pregnancy, will at once be appreciated; for, if the axis of the superior strait and that of the trunk were identical, the necessary physical result would be the descent of the gravid uterus into the pelvic cavity, causing undue pressure on the adjacent viscera, and other pathological derangements, which would materially interfere with the full development of a healthy gestation.

Bones of the Pelvis.—The adult pelvis is composed of four bones, viz. the *sacrum*, *coccyx*, and two *ossa innominata*. The two former constitute the posterior wall of the pelvis, while the innominata, one on each side, form the lateral and anterior boundaries of the canal. You will read in the books that, while the adult pelvis has but four bones, the fetal pelvis numbers fourteen. The reason of this difference is easily explained. In the system of the young subject, ossification not being complete, the sacrum presents very distinctly five pieces, and the coccyx three, making, for these two bones, eight pieces: while each os innominatum presents three divisions, making, for the two innominata, six pieces; so that, five for the sacrum, three for the coccyx, and six for the innominata, give the fourteen of which the fetal pelvis consists. But, when the process of ossification is completed, which occurs about the time of puberty, these various divisions become consolidated; so that, in adult age, the pelvis is composed only of four bones, instead of fourteen, as was the case in early life.

The *os sacrum* (Fig. 2) is triangular in shape, situated at the posterior and central portion of the pelvis, below the last lumbar vertebra, above the coccyx, and wedged in, as it were, between the two *ossa innominata*. Its structure is mostly spongy, covered by a thin layer of compact tissue; hence, proportionate to its size, it is remarkable for great lightness, which is increased by the large number of foramina found on its surface. The five bones, which originally composed it, are termed the *false sacral vertebrae*. It is well to mention, that occasionally there will be six, and

sometimes only four pieces entering into the formation of this bone. The direction of the sacrum, in its connexion with the



FIG. 2.

other pelvic bones, is oblique from before backward, and from above downward, so that it forms in front, at its junction with the last lumbar vertebra, a prominent obtuse angle. It is divided into an anterior surface, a posterior surface, two lateral surfaces, a base, and a summit, or apex.

The *anterior* surface (Fig. 2) presents some interesting points for the accoucheur. Together with the coccyx, as has already been

remarked, it constitutes the posterior wall of the pelvic cavity, being much more concave in the female than in the male; there are four transverse lines on this surface, marking the points of original separation between the five bones which have now become consolidated into one mass. Just on the outer portion of these lines, on either side, are several foramina, usually four in number, called the anterior sacral foramina, which afford transmission to the anterior sacral nerves. This surface is occupied by the rectum, and what is known as the meso-rectum, which is nothing more than a fold of the peritoneum; blood-vessels, and the anterior sacral plexus* of nerves, together with a portion of the pyriformis muscle, will also be found at this point.

* The anterior sacral, or sciatic plexus of nerves, as it is sometimes called, is formed by the union of the four upper sacral and last lumbar nerves; the plexus is situated at the side of the rectum, and rests on the anterior surface of the pyriformis muscle. It is covered in front by the pelvic fascia, by which it is separated from the sciatic and pudic branches of the hypogastric artery, and also from the pelvic viscera. I am quite confident that sufficient attention has not been given to the influence of the anterior sacral plexus of nerves in producing many pathological phenomena in women, not only during pregnancy and childbirth, but also in married women who have never borne children, and especially in young girls. The student should remember the multiplied connexions of this plexus, through nervous distribution, with other portions of the system; and he will then appreciate why an irritation of the anterior sacral plexus, no matter from what cause (and how often is a rectum, loaded with fecal matter, the only source of this irritation?), will oftentimes give rise to annoying disturbances in other portions of the system, which, unhappily for the patient, are too frequently regarded as idiopathic, or primary

The *posterior* surface of the sacrum (Fig. 3) is convex and rough, forming, in these particulars, a striking contrast with the anterior surface. Passing perpendicularly down the centre will be observed several small eminences, the analogues of the spinous processes of the vertebral column; on the sides of these eminences will be seen the four posterior sacral foramina, for the passage of the posterior sacral nerves. This surface presents nothing of special interest to us, except that it may be denomi-



FIG. 3.



FIG. 4.

nated a subcutaneous surface, as usually nothing intervenes between it and the integuments but muscular aponeuroses. This latter fact has a certain importance in the application of the pelvimeter for the measurement of the pelvis; and we shall again allude to it when speaking of pelvic deformities.

The two *lateral* surfaces (Fig. 4) are broad and thick above, and tapering below; their upper portion presents an irregular articular surface, by which, through the medium of cartilage,

whereas they are but symptoms or evidences of trouble elsewhere. In order that the pupil may see the force of what I have just stated, let us give a running outline of some of the more important connexions of this plexus of nerves. The four first anterior branches of the sacral nerves, besides contributing to the formation of the sacral plexus, communicate with the sacral ganglia of the great sympathetic, or trisplanchnic, which presides over organic life. From this it is easy to understand how digestion, the nutritive functions generally, and, in a word, any portion of organic existence, may become deranged from original irritation of the sacral plexus. The fifth anterior sacral nerve passes to the sphincter, levator ani, and coccygeous muscles. May we not, by remembering this latter fact, be oftentimes enabled to explain many of the morbid phenomena occurring in these parts? In addition to the portions already named as being supplied with nerves from the sacral plexus, we may state that the three glutei muscles, and the labia externa, also derive nerves from the same source.

it is united to the corresponding iliac bone, forming the sacro-iliac symphysis. Posterior to this articular surface are several eminences and depressions, affording attachments to strong ligamentous fasciculi, which are inserted into the iliac bones. The lower portions of the lateral surfaces, where they become thin and tapering, are covered by dense fibrous tissue, which contributes to the formation of the greater and lesser sacro-ischiatic ligaments.

The *base* exhibits a large articular surface, the direction of which is oblique from before backward, and from above downward, and which becomes united to the last lumbar vertebra; immediately behind this surface is a triangular opening, the commencement of the canal, which extends nearly along the entire length of the bone, and affords lodgment to the sacral nerves.

The *apex* or summit of the sacrum exhibits nothing worthy of attention, with the exception of an oval surface, which articulates with the upper portion or base of the coccyx.

The *coccyx* (Fig. 5) is a small triangular bone, formed by the union of three, and occasionally of four small pieces; it receives its name from the resemblance to the bill of the cuckoo; it is situated at the lower and posterior part of the pelvic canal, and articulates with the apex of the sacrum. Like the latter bone, the coccyx is divided into an anterior and posterior surface, two lateral surfaces, a base and summit.



FIG. 5.

The *anterior* surface is concave, and receives the lower extremity of the rectum; on this surface are seen transverse lines, which designate the original points of separation of the three or four pieces of which the bone was originally composed.

The *posterior* surface (Fig. 6), convex and irregular, affords attachment to some of the fibres of the large glutei muscles, and to the posterior sacro-coccygeal ligament.



FIG. 6.

The two *lateral* surfaces, thin and irregular, give attachment to the ischio-coccygeal muscles, and the small sacro-ischiatic ligaments.

The *base*, slightly concave, has an oval surface, which unites with the summit of the sacrum.

The *apex*, terminated by an osseous tubercle, which is occasionally bifurcated, usually projecting forward, but sometimes laterally or backward, gives insertion to the levator ani and external sphincter ani muscles.

The coccyx oftentimes exercises an important influence during childbirth, and especially in women who marry late in life, say from thirty to forty years. As I shall have occasion to mention, when speaking of the articulations of the pelvis, the sacro-coccygeal articulation in the female is a movable one, and hence, during the passage of the child through the maternal organs, the coccyx

recedes so as to enhance, from one half to three quarters of an inch, and sometimes more, the antero-posterior diameter at the inferior strait of the pelvis. But, in women who do not bear children prior to thirty years of age; this articulation is apt to become so consolidated as to offer great resistance to the efforts of the uterus, thus involving the necessity of instrumental delivery. Your attention shall be particularly directed to this subject in another part of these lectures.

One more fact in reference to the coccyx, and it is this: you will sometimes observe in practice, especially when the head of the fœtus is beyond the usual size, that the coccyx will be pushed so far backward as to form an inverted angle with the lower portion of the sacrum. The patient will complain of pain in consequence of this position of the bone, and I have known it in more than one instance to result in inflammation and ulceration of the parts, giving rise to a very unpleasant condition of things. The rule, therefore, for you to pursue in these cases, is at once, as soon as the delivery is completed, to replace the bone, which is easily accomplished by taking a small piece of padded cotton in your fingers, and with it make gentle pressure on the coccyx, which will readily yield and assume its natural position. This may appear a very trivial suggestion, but it is one well worthy of recollection.*

The *os innominatum* (Fig. 7), known as the *cozal*, or *haunch* bone, is the largest of the flat bones in the skeleton; it is irregular in shape, being contracted in its central portion, and, as it were, twisted on itself in opposite directions; it forms, with its fellow, three-fourths of the circumference of the pelvic cavity; it is situated between the sacrum and *os femoris*, and constitutes the lateral and anterior boundaries of the pelvis. The innominatum presents three divisions, or regions, the first of which, superior and posterior, is called the *ilium*; the second, which is in front, the *pubes*; and the third, situated inferiorly, the *ischium*. Though the bone is con-

* It will occasionally happen that the coccyx is fractured during delivery; and this is apt to occur when the bone has become completely ankylosed to the sacrum. Under these circumstances, the head of the child, driven by the uterine effort against the sacro-coccygeal articulation, constitutes a force which the coccyx cannot resist, and it becomes fractured. The rude and unskilful use of instruments will also sometimes produce the same result. In such a contingency, all that is necessary, as a general rule, will be to enjoin on the patient absolute rest; let the bowels be in a moderately soluble condition, in order that the rectum may not become loaded with fecal matter, which latter circumstance would induce irritation and interfere with the restorative process; and it must not be forgotten that an important feature in the management of this case is to retain, as far as may be, the coccyx in the position it usually occupies with the sacrum; for otherwise, by being allowed to project too far forward, it would necessarily, after the fractured surfaces had become consolidated, abridge the antero-posterior diameter of the inferior strait, thus, in the event of a subsequent pregnancy, entailing on both mother and child some of the perils consequent on a pelvic deformity.

solidated into one mass in adult age, yet, in early life, as you have been told, it is divided into three distinct portions; these all unite at a common point, viz. the acetabulum, or cotyloid cavity, which



FIG. 7.

receives the head of the thigh-bone, being an example of the articulation known as *enarthrosis*.

1. The *ilium*, the largest of the three divisions, is nearly triangular in shape, and has two surfaces, an external and internal; three borders, and three angles.

The *external* surface (Fig. 8), slightly undulating, is called the *dorsum* or back, and is occupied by the three *glutei* muscles; there is nothing of obstetric importance connected with it.

The *internal* surface is divided into an upper or anterior, a lower, and posterior portion. The anterior or upper surface is broad, concave, and smooth; it is called the *iliac fossa* or *venter*, and is occupied by the *iliacus internus* muscle. This surface is separated from the lower portion of the bone by the *linea-ilio-pectinea*, a line which passes along the brim or superior contour of the pelvis; it is this lower portion of the ilium which contributes to the formation of two-fifths of the acetabulum. The posterior surface is made up of that part of the ilium immediately behind the iliac fossa, and which presents a regular aspect, of which there are two

The superior is concave, and is occupied by the iliac ligaments, while the inferior is convex, and the intervention of carti-

lage—an articulation known as synchondrosis—with the corresponding lateral surface of the sacrum.

The *superior* border of the ilium presents the figure of an italic *S*, and is sometimes called the crest of the ilium; it is the longest



FIG. 8.

of the three borders, and is divided into an internal and external lip, and also into an intermediate substance, the interstice. The internal lip affords attachment to the transversalis, quadratus lumborum, and erector spinæ muscles; while to the external lip are attached the obliquus externus, the latissimus dorsi, and femoral aponeurosis; the obliquus internus is inserted into the interstice. At the anterior extremity of the superior border, is found the anterior superior spinous process, the central portion of which gives origin to the sartorius muscle and Poupart's ligament, the outer portion to the tensor vaginæ femoris, and the internal surface to the iliacus internus muscle. Posteriorly, the superior border is terminated by the posterior superior spinous process.

The *anterior* border commences at the anterior superior spinous process, and presents two notches, one of which is larger and less superficial than the other; these notches are separated by the anterior inferior spinous process, into which is inserted the straight tendon of the rectus femoris muscle.

The *posterior* border is bounded above by the posterior spinous process of the ilium, beneath which is a notch separating it from another projection, the posterior inferior spinous process; below is the great ischiatic notch.

The three *angles* of the ilium are nothing more than certain projections resulting from the junction of the three borders; for example, the crest of the ilium forms, with the anterior border, an obtuse angle, the anterior superior spinous process; while the junction of the crest with the posterior border forms the second angle, the posterior superior spinous process; and the third angle is represented by the union of the anterior and posterior borders, which, from its size, is sometimes described as the base of the ilium.

2. The *os pubis* is divided into two rami or branches; the horizontal ramus, sometimes called the body of the pubes, extending from the symphysis pubis to the acetabulum, of which it contributes to form one fifth; this ramus affords the superior boundary of the obturator foramen, while the descending ramus passing downward to unite with the ascending branch of the ischium, constitutes the internal wall or boundary of this same foramen. It is worthy of remark that the descending branch of the pubes does not descend vertically, but, on the contrary, forms, with its fellow on the opposite side, a space resembling an inverted V, known as the pubic arcade; this latter is much wider in the female than male, for the obvious reason that it affords egress to the child.

3. The *os ischium*, *os sedentarium*, or seat-bone, may be divided into two surfaces, two extremities, two borders, and a spinous process.

The *external* surface is convex and irregular, and contributes to the formation of two-fifths of the acetabulum, and also forms the external boundary of the obturator foramen.

The *internal* surface is smooth and slightly concave, and extends from the superior to the inferior strait of the pelvis; this surface presents a point of great value to the obstetrician, one which cannot too closely occupy his attention, for without an accurate knowledge of its direction and uses, it will be impossible to comprehend the mechanism of labor. I allude to what is known as the *inclined plane* of the ischium; its direction is from above downward, from behind forward, and from without inward; it is on this plane, partly, that the head of the fœtus rotates during its passage through the pelvic cavity.

The *superior* extremity is thick and broad, and becomes confluent with the base of the ilium.

The *inferior* extremity is known as the *tuberosity of the ischium*, that portion of the bone on which we sit; from the internal portion of the tuberosity springs the ascending ramus of the ischium, which unites with the descending ramus of the pubes. From the outer portion of the tuberosity arise the quadratus and adductor muscles; and from the inner portion proceed the inferior geminus muscle, and great sacro-ischiatic ligament; the biceps flexor cruris, semi-tendinosus, and semi-membranosus, arise from the central portion of the tuberosity.

The *anterior* or *internal* border aids in forming the obturator foramen, while the *posterior* or *external* border regards the sacro-ischiatic notch. About the inferior third of this notch is observed an eminence, extending obliquely downward and backward, known as the spinous process of the ischium.

Under ordinary circumstances, this process does not possess much interest; but it will occasionally exercise a very important influence on the progress of childbirth. For example, it is sometimes curved inwardly, exhibiting a sort of hook-like process; in this case, as the head or presenting portion of the child descends into the pelvic cavity, it becomes arrested by this spinous projection. The uterus still continues to contract with great energy; there is no progress in the delivery; the life of the child is placed in serious peril; the strength of the mother is becoming rapidly exhausted; and the accoucheur is urged by anxious friends to do something to relieve the suffering patient. If, on a careful examination, he should ascertain the true cause of the difficulty, namely, the impediment offered by the abnormal condition of the spinous process of the ischium, he would proceed at once to overcome the obstruction, by introducing either the vectis or one blade of the forceps, for the purpose of liberating the head, or whatever portion of the fœtus may present, from the antagonism offered by the malformed spinous projection; and thus, by timely and judicious interference, he saves the lives of both mother and child. If, on the contrary, the practitioner, as unhappily is too often the case, should limit himself to an abstract view, and suffer his mind to be exclusively centred on the fact that *the delivery does not progress, notwithstanding the strong efforts of the uterus*, he would most probably, under the circumstances, have recourse to the operation of embryotomy, which necessarily involves the destruction of the child, while, at the same time, it places in serious hazard the safety of the mother.

Let me, gentlemen, thus early in the course, caution you against this unjustifiable, nay, cruel tampering with human life. It will be my pleasure and constant aim, in the present series of lectures, to inculcate upon you an inflexible principle, namely, that the cardinal object of the accoucheur, when he crosses the threshold of the lying-in chamber, should be a conscientious exercise of his skill to mitigate, as far as may be, the sufferings of his patient, and conduct her safely through the perils of her parturition.

These objects can be attained only by a thorough knowledge of, and practical familiarity with the details of the science, the end of which is to afford safety to both mother and child at the most trying, and, at the same time, the most interesting era of woman's life—when suffering the pangs of labor.

LECTURE II.

Uses of the Pelvis—Articulations, or Joints of the Pelvis—Do these Articulations during Pregnancy become Relaxed?—Is their separation necessary, at the time of Labor, for the passage of the Child?—Objections to the Theory of Separation—Pathological Changes in these Articulations—Form of the Pelvis—The Greater and Lesser Pelvis—Straits of the Pelvis—The Pelvis is a Crooked Canal; Proof—Axes—Varieties of the Human Pelvis—Influence of Sex and Age—Contrast between the Male and Female Pelvis—Pelvis of the newborn Infant—The Pelvis in Connexion with the Soft Parts—Its Measurements.

GENTLEMEN—In the preceding lecture your attention was directed to the consideration of the bones of the pelvis; and having described, in detail, the peculiarities of each of them, it now remains for me to show you in what way nature has provided for their solid union, so that, in the aggregate, they may exhibit a power of resistance absolutely essential for the adequate discharge of their various functions. It is only necessary to reflect for a moment on what is required of the pelvis, to appreciate that, for the proper performance of its duties, great solidity is needed. In the first place, not to speak of its offices at the time of parturition, it is the foundation of the trunk, sustaining, through the articulation of the spinal column with the sacrum, the superincumbent weight of the body, which, in the standing position, is transmitted to the inferior extremities, and, in the sitting, to the tuberosities of the ischia. The pelvis is also called upon to afford accommodation and protection to its viscera, viz. the uterus and its appendages, together with the rectum and bladder. Another important office is to receive the attachments of muscles, the object of which is to produce different movements of the trunk and lower extremities. Again: it has to sustain itself against the resistance offered by the lower extremities in the support they afford to the weight of the body. You see, therefore, without adequate provision for the proper binding together of the individual bones, how incompatible these duties would necessarily be with the integrity of the pelvis.

Articulations of the pelvis.—The articulations are termed symphyses, and are as follows: The *sacro-coccygeal* symphysis; the *symphysis pubis*; and the two *sacro-iliac* symphyses.

The *sacro-coccygeal* symphysis results from a junction of the two oval surfaces, one of which is at the apex of the sacrum, the

other at the base of the coccyx; the junction is through the medium of a fibro-cartilage, thus resembling the mode of articulation between the bones of the vertebral column. In addition, this symphysis is supported by an anterior and posterior sacro-coccygeal ligament, which, respectively, descend from the anterior and posterior surfaces of the sacrum, and distribute themselves upon the corresponding surfaces of the coccyx. The three or four bones, which constitute the coccyx, are also united through the interposition of a fibro-cartilage, and it is alleged that the sacro-coccygeal articulation becomes ankylosed earlier than the first and second pieces of that bone. I need not repeat here what I have already stated, in the preceding lecture, as to the mobility of the sacro-coccygeal articulation, and its influence on childbirth.

The *symphysis pubis* is formed by a union of the two pubic bones; each of these bones presents an oval surface, slightly convex and uneven, the inequalities of which, however, are removed by the expansion of a layer of fibro-cartilage. In consequence of the convexity and peculiar direction of these surfaces, they are in contact only at their posterior portion, and for a small distance, so that superiorly, in front, and inferiorly, there is a space, which is occupied by the inter-pubic ligament. This ligament varies in thickness in the different points of its position; for example, it is thickest above, while, as it passes in front and behind, it loses its volume; below, it becomes suddenly increased, and, by its expansion, forms the sub-pubic or triangular ligament. In addition, the symphysis pubis is strengthened by the anterior pubic ligament, made up of two planes of fibres, one superficial, the other deep-seated. The former commingles with the fibres of the two recti muscles, separating into two bands, and distributing themselves over the descending rami of the pubes; the latter extends from one pubic bone to the other, and becomes ultimately lost in the inter-articular fibro-cartilage.

The *sacro-iliac* symphyses, one on either side, result from the union of the lateral surfaces of the sacrum, with the two corresponding surfaces of the ossa ilii, the sacrum being fitted in like a wedge between these bones. From the office of the sacrum, receiving through the spinal column the weight of the body, more than ordinary security is required in the arrangements by which the junction between this bone and the two ilia is effected. The union is accomplished in the first place through the medium of cartilage, which, it is said by some authors, is confined to the articular surface of the sacrum alone; while, by others, it is contended that the same material exists also on the articular surfaces of the iliac bones. In addition to this mode of union, these two articulations are strongly fortified by various ligamentous bands; for example: 1. The *sacro-iliac* ligaments, known as the anterior and

posterior; they are simply an assemblage of ligamentous fibres, above, below, and at the posterior portion of the sacro-iliac junction, but which, from the multiplicity of the fibres in close approximation, render them efficient in giving strength to this articulation. 2. The *greater or posterior sacro-sciatic ligament*, which is flattened and triangular, and occupies the inferior and posterior portion of the pelvis; besides strengthening the sacro-iliac symphysis, it completes the walls of the lesser pelvis, and aids in supporting the weight of the viscera lodged within the pelvic cavity. It arises from the tuberosity of the ischium, and is inserted into the lateral surfaces of the sacrum and coccyx, and also into the posterior inferior spinous process of the ilium. 3. The *lesser or anterior sacro-sciatic ligament*, which is also triangular, is situated in front of the other, and answers the same uses. It extends from the spinous process of the ischium to the sides of the sacrum and coccyx. These two ligaments convert the ischiatic notch into two foramina. The first is the larger, and gives transmission to the pyriformis muscle, the great ischiatic nerve, and also to the internal pudic nerves and vessels; while the second affords passage to the internal obturator muscle, and internal pudic vessels and nerves.

I shall next call your attention to one other articulation, viz. the *sacro-vertebral*. It results from the junction of the base of the sacrum with the lower articulating surface of the last lumbar vertebra. In the first place, the union is formed by a fibro-cartilage, which is much thicker in front than posteriorly, and this explains in part the great prominence of this articulation; secondly, there are various ligaments which contribute to its consolidation—the anterior and posterior vertebral ligaments, the inter-spinous,



FIG. 2.

together with the sacro-vertebral ligament. In addition to these, there are the ileo-lumbar and ileo-vertebral ligaments.

Relaxation of the pelvic articulations—their separation at the time of labor.—In connexion with the pelvic articulations, an extremely interesting question arises. Do these articulations, during pregnancy, become relaxed, and, at the time of parturition, separate; and, if so, is this separation required for the properly carrying out of the reproductive scheme? To show that this question is not unimportant, I may mention that it has not only attracted the attention of the learned in our science, but it has called forth earnest advocates both on the affirmative and negative side; and it, therefore, is, in the strict acceptation of the term, a debatable subject. It was a favorite notion of the early fathers—and such was the belief entertained for a period of two thousand years—that the various pelvic symphyses did positively become relaxed during gestation, and separated at the time of labor for the purpose of affording increased facility to the passage of the child. This opinion, it seems, was the universally accepted one until the sixteenth century, when, for the first time, it became the topic of controversy, and to this day it cannot be said to be settled.

There can be no doubt that the symphyses do become more or less relaxed during the progress of gestation, and this relaxation is in perfect keeping with other phenomena, which occur at this period. As I shall have occasion to tell you, when speaking of the changes in the uterine organs consequent upon pregnancy, one of the first of these modifications is an increased afflux of fluids to the parts, the result of which is a gradual relaxation and increase of the tissues composing the uterus. But this afflux is not confined to the uterus; it pervades the surrounding structures, and, among them, the very structures constituting the bonds of union with the different bones composing the pelvic canal; in this way, no doubt, the temporary relaxation is produced.

There are, however, in my mind, two solid objections to the hypothesis that these bones separate at the time of parturition: 1. There is no necessity for this separation, for the reason that, in a well conformed pelvis, there is absolutely more space than is required for the safe passage of an ordinary fœtus; and if the separation did really occur, it should be found much more frequently in cases of pelvic deformity than when the canal possesses its normal dimensions, which, as far as I know, has not been shown to be the fact; 2. It is not to be supposed that these bones could become detached sufficiently to increase the cavity of the pelvis, without entailing upon the parturient female the absolute necessity of retaining the recumbent position for weeks and months subsequently to her labor; which is contrary to all experience, for the great majority of women indulge in locomotion some six or seven days after confinement, and without any perceptible difficulty, except the ordinary weakness incident to their condition. So much,

then, for the general fact touching the uniformity of this separation of the pelvic bones.*

On the other hand, it cannot be doubted that the articulations of the pelvis will occasionally become the seat of serious inflammatory action, resulting in purulent engorgements, and other derangements, requiring consummate skill on the part of the practitioner to rescue his patient. But this is a pathological condition, and, therefore, presents no support to those who contend that separation of the pelvic bones is one of the phenomena of labor.

The Greater and Lesser Pelvis.—The general form or configuration of the pelvis is characterized by striking irregularity; in order that you may have a comprehensive idea of that portion of the canal which bears directly on parturition, I shall describe to you respectively its two divisions, namely—the *greater* and *lesser* pelvis.

The *greater pelvis* presents an irregular form, and is bounded by three walls—two lateral and one posterior; the lateral walls are



FIG. 10.

formed by the two iliac fossae, while the posterior consists of the terminal extremity of the spinal column, immediately beneath which is the sacro-vertebral prominence. The anterior wall is completely wanting in the skeleton, while, in the living or recent subject, it consists of the muscles and other structures constituting the

front and lower portion of the abdomen.

The *lesser pelvis*, which is directly below the greater, exhibits two openings, which have received the names of straits, for the simple reason that they are narrower than the intermediate portion, which is called the cavity of the pelvis. These straits are denominated the superior, or abdominal, and the inferior, or perineal. The superior strait, known as the brim, or inlet, consists of a prominent, irregular curved line; this line has a greater elevation posteriorly than in front. It commences in the middle of the sacro-

* It is well known, however, that in certain animals there is a positive separation of the pelvic joints at the time of parturition; for example, in the cow, one of the indications of approaching labor will be a sinking down of the os sacrum between the posterior surfaces of the ossa ilii. Le Gallois called attention to the fact, that a very remarkable separation of the symphysis pubis occurs in the guinea-pig; and Mr. Robertson has ascertained, by actual experiment, that this separation will take place to the extent of one inch.

vertebral prominence, and descends obliquely along the inferior border of the iliac fossæ, where it becomes slightly rounded; as it approaches the pubes, it is sharp, or cutting, and finally terminates on either side of the symphysis of this bone—it is known as the *linea ileo-pectinea*.

It is difficult to describe accurately the form of the superior strait—some call it a circle, some a triangle, and others say it is an ellipsis. Strictly speaking, it is neither one nor the other of these figures. But it is important for you to remember, in connexion with this strait, that there are six points, some of which have an interesting bearing on the various positions of the fœtus, as will be more particularly shown when treating of that subject. These points are three anteriorly, and three posteriorly; the three former are the right and left acetabula and symphysis pubis; the three latter are the right and left sacro-iliac symphyses, and the sacro-vertebral prominence.

The inferior strait, or outlet, is much more irregular than the superior, and exhibits, as worthy of attention, three openings, one anteriorly, and two posteriorly; these openings are separated by three bony eminences, one of which is behind, and the two others on the sides. The anterior opening, or notch, is called the sub-pubic arcade, for the reason that it is immediately under the pubes; it is formed by the ascending and descending branches of the ischium and pubes, which present, as you have been reminded, the form of an inverted V, and slightly twist upon themselves forward, and outward, so that their internal border is nearly in front, while their posterior surface is directed inward. The posterior openings are called the sacro-ischiatic, because they are bounded by the sacrum posteriorly, and the ischium in front. The three bony eminences, which separate them, are the two tuberosities of the ischia on the sides, and the coccyx behind.



FIG. 11.

The lesser pelvis has four walls—one anterior or pubic, one posterior or sacral, and the other two lateral or ischiatic. The anterior wall is the length of the symphysis pubis, while the posterior is the extent of the sacrum and coccyx—so that the latter is two thirds longer than the former—a most important fact to note in memory; for, as a direct consequence of this difference in extent of the posterior and anterior walls, there is to be deduced a practical lesson of great value, viz. that when the occiput of the child's head is at either the right or left acetabulum, the labor, all things being equal, will be much shorter than when it continues at one or other of the posterior iliac symphyses; and this arises from the fact that, in the former case, the occiput has to traverse only one third the distance which it would be required to do had it to pass along the length of the posterior wall of the pelvic cavity. The two

lateral walls are formed by the ischiatic bones; they extend from the superior strait to the tuberosities of the ischia, and, in their widest portion, reach from the sacro-iliac symphysis on either side, to the posterior and middle portion of the corresponding acetabulum.

The *inclined planes* of the pelvic cavity are worthy of a moment's attention, for they exercise an important influence during the passage of the child through this canal. These planes are four in number, two anterior and two posterior; and, in order that a definite idea may be had of them, it has been suggested to make two vertical sections of the lesser pelvis, so as to divide it into four equal parts. Thus, the two anterior planes would be represented by a portion of the lateral, and the entire of the anterior surface of the excavation; while the sacrum and coccyx, together with the sciatic ligaments, and sacro-iliac articulations, would constitute the two posterior planes. When speaking of the mechanism of labor, we shall again refer to this subject, in connexion with the manner in which the foetal head is made to glide along these planes in its passage through the pelvis.

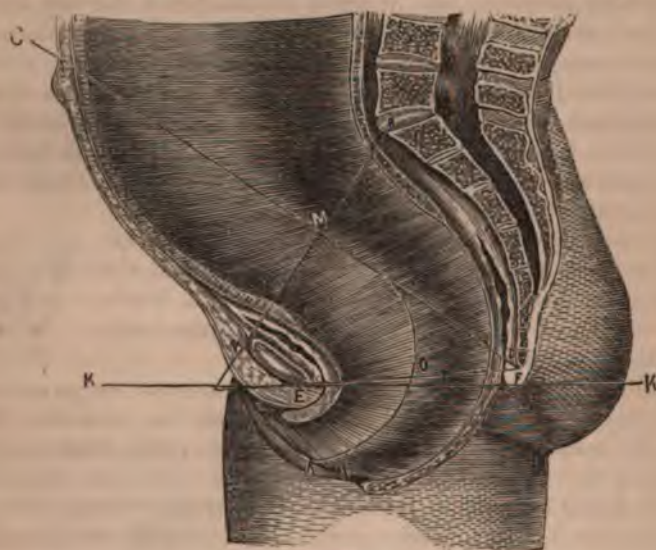


FIG. 12.

A, B, Plane of superior strait. E, F, Plane of inferior strait. K, K, Line representing horizon. C, D, Axis of superior strait. M, O, K, Central curved line of excavation.

Planes of the Two Straits.—You have already been made acquainted with the fact of the obliquity of the pelvis to the horizon, in the standing or erect position, and this is demonstrated (Fig. 1) by placing a line on the summit of the cranium, and

passing it perpendicularly downward, so as to represent the axis of the body. This line, in its course downward, strikes on the symphysis pubis, which would not be the case if the pelvis did not occupy, relatively to the trunk, an oblique position. The peculiar direction of the pelvis involves the necessity of an exposition of what are known as the planes of the superior and inferior straits; a knowledge of these planes, with a due appreciation of the characteristics of each, is one of the essential elements to a proper understanding of the principles which regulate the passage of the child through the maternal organs.

The plane of the superior strait (Fig. 12) is an imaginary superficies, extending over the brim of the pelvis; and, in order that all confusion may be removed, let us suppose the strait to be closed, as happily suggested by Lenoir, by a sheet of paper perfectly adapted to its size and configuration. This sheet of paper will represent the plane of the upper strait, while that of the outlet, or lower strait, will be indicated by a piece of paper similarly applied. Here, then, we have the two planes, respectively, of the two straits. The true relations which these planes bear to each other, and to the trunk, together with the line of their axes, has formed the subject of much discussion, giving rise to very contradictory opinions.

It would not be profitable to allude further to this controversy than simply to remark that Naegelè, in a memoir published by him in 1825, gives an interesting analysis of the various opinions advanced, and presents his own deductions, which have been generally adopted. He has shown, by numerous and careful experiments, that the inclination of the plane of the superior strait to the horizon is from 59° to 60° , and that of the inferior from 10° to 11° . The sacro-vertebral prominence has an elevation of three and three quarter inches greater than the upper surface of the symphysis pubis; and, if a line parallel with the horizon be extended from this latter point, it will reach the coccyx at the union between the second and third pieces of this bone. Again: the extremity of the coccyx is more than half an inch higher than the summit of the pubic arcade.*

Axes of the Pelvis.—The axes are three in number, viz. the axis of the superior strait, the axis of the inferior strait, and the axis of the excavation. What is the true meaning of the term pelvic axes? They are certain imaginary lines (Fig. 13) which shall pass perpendicularly through the centre of the planes of this

* It is, however, to be recollected that this elevation of the coccyx does not often obtain during the transit of the child through the inferior strait; for, at this time, the coccyx, owing to its mobility, is turned backward and downward, so that, in lieu of elevation, it becomes on a level with, and sometimes is even below, the inferior portion of the pubic symphysis.

canal. In order to appreciate the axis of the superior strait, we will suppose a line which, intersecting the middle of the antero-posterior diameter of this strait at a right angle, and being carried upward, will strike the umbilicus; on the contrary, if directed downward, it will fall on the coccyx. The axis of the inferior strait will be represented by a line intersecting the centre of the cocci-pubic diameter of this strait at a right angle, which line will terminate superiorly below the sacro-vertebral prominence; and its inferior terminal point, with the coccyx in position, will be through the centre of the bis-ischiatic diameter, and, if carried through the soft parts, will pass to the anus itself. At the time of labor, however, when the coccyx recedes, the direction of this axis will necessarily undergo a change; for, in this case, the lower extremity of the line would be slightly posterior to the anus, while the upper extremity would commence a little in front of the sacro-vertebral prominence.

From what has just been said touching the axes, which respectively define the direction of the two straits, it is evident that the junction of these two lines will represent an obtuse angle. This result, however, would prove a physical impossibility, if the straits were on the same plane; for, as you will readily perceive, in such an event the line passing through the centre of the upper strait, instead of terminating on the coccyx, would penetrate directly the centre of the lower strait; or, perhaps, more properly speaking, the centre of the vulva.

The axis of the pelvic excavation now claims our attention, and it is this axis which presents special interest to the accoucheur; for the line, which ultimately describes it, indicates, with unfailing precision, the direction pursued by the fœtus in its passage through the canal. The axis of the excavation will be found by extending a line from the superior to the inferior strait, which in its course shall be equidistant from the four pelvic walls by which the excavation is bounded. Now, if it be recollected that the posterior wall of the pelvic cavity is, under ordinary circumstances, not straight, but curved, and also two-thirds longer than the anterior wall, it will follow that the line which shall represent the axis of the excavation must be subjected to a corresponding curve. In one word, the axis will be described by a line in accordance with the curve of the sacrum and coccyx, and which is known by obstetricians as *the central curved line of the excavation*.* It is proper to mention here that this curved line is made up of a series of perpendiculars falling

* It has already been observed, that change of position of the individual will effect a variation in the direction of the planes and axes of the superior and inferior straits; but it should be distinctly remembered, as an important obstetric fact, that *the central curved line of the excavation* is always identical, and in no way influenced by position.

on the numerous planes in the cavity of the lesser pelvis (Fig. 18) ; and it is also to be noted that the inferior extremity of the curve is both elongated and brought forward by the distension to which the

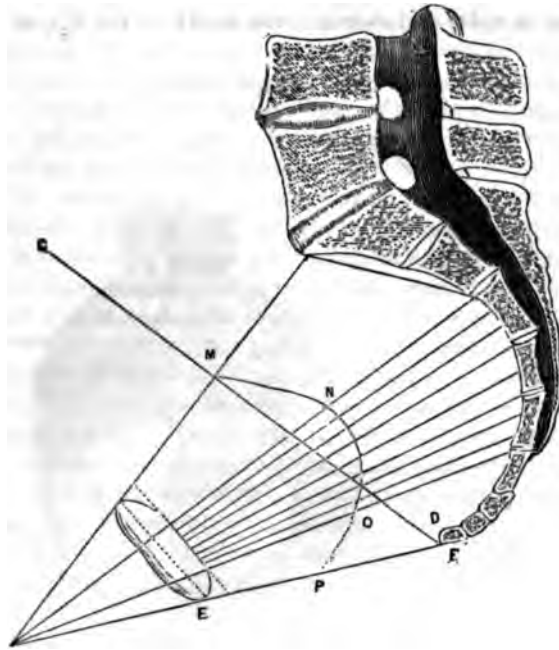


FIG. 18.

C, D, Axis of superior strait. E, F, Plane of inferior strait. M, N, P, Central curved line, or axis of excavation.

perineum, vagina, and vulva are subjected during the parturient effort.

There is nothing, gentlemen, more essential for you to remember, if you wish to have a clear idea of the mechanism of labor, than the direction of the pelvic axes. They point out, in the first place, the course which the fœtus pursues in its exit—(Fig. 14) showing, conclusively, that its progress through the maternal organs involves the necessity of its becoming curved upon itself as it follows the lines of these axes, the concavity of the child's curve regarding the symphysis pubis, the convexity the hollow of the sacrum. The appreciation of these axes is absolutely necessary, in all operations for the delivery of the child, whether manual or instrumental ; nor can you, for the purpose of extracting the afterbirth, or for any other object, attempt to introduce the hand into the uterus without subjecting the patient to the most serious hazard, unless guided by an accurate knowledge of the curves of the pelvis, and the correspondence of the uterus with these curves. To this latter point we shall revert, when discussing the subject of natural labor.

Varieties of the Human Pelvis.—The human pelvis presents certain characteristic varieties, depending upon the sex and age of the individual. The adult female pelvis (Fig. 9), for example, exhibits a striking contrast with the pelvis of the male. In the first place, the former is wider and shorter; the crests of the ilia, as also the

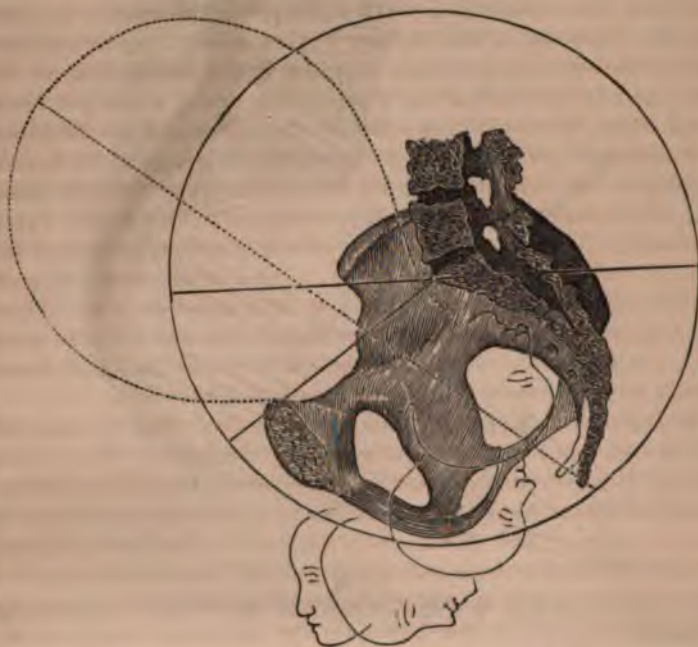


FIG. 14.

two anterior superior spinous processes, are further apart, which affords a greater capacity to the iliac fossæ. The superior and inferior straits likewise present characteristic differences; the contour of the upper strait is larger and more rounded in the female, and the sacro-vertebral prominence is less marked than in the male; the two tuberosities of the ischia are less thick, and are turned more outwardly. The sacrum is shorter and more concave, while the os coccyx is further from the pubes, which gives a greater capacity to the inferior strait of the female in its antero-posterior, or cocci-pubic diameter. One of the most striking differences between the pelves of the two sexes is observable in the arrangement of the pubic arcade; in the female it is capacious—in the male (Fig. 10), on the contrary, it is narrow. This arcade, you must remember, affords passage to the child during its progress through the maternal organs.

It is impossible to contrast these points of difference without at

once perceiving that nature, in the construction and arrangement of the pelvis of the female, was influenced by one cardinal object, namely, the adaptation of the canal to the necessities of childbirth.

But, this peculiar construction of the female pelvis, while, all things being equal, it amply provides for the wants of parturition, brings with it certain inconveniences. For instance, I have shown you that, from the greater width of the pelvis, the anterior superior spinous processes of the ilia are further apart; from this circumstance, femoral hernia is more frequent in the female than in the male, and for the reason that Poupart's ligament, which you know extends, on either side, from one of these processes to the pubes, will necessarily present a larger space for the passage of the hernia. Again: in the female pelvis, the distance between the two acetabula is greater than in the male; consequently, the inferior extremities, being more remote from the centre of gravity, impart to the female, in the act of progression, a vacillating, unsteady gait, resembling, in some sense, the walk of a goose or duck. These inconveniences, however, are insignificant compared with the great advantage she derives, in the discharge of one of the chief duties of her sex, from the peculiar configuration of her pelvis.

If you inspect the pelvis of the new-born child (Fig. 11), you will observe several remarkable differences between it and that of the adult. It is very much elongated, the superior strait looking downward and forward; it is more or less in a cartilaginous state; the sacrum is almost flat, and so elevated, that if a line be drawn horizontally backward from the upper portion of the pubes, it will strike the summit or apex of this bone. The iliac fossæ are scarcely developed, while the iliac bones themselves are almost perpendicular at their upper portions. From this peculiar arrangement of the pelvic bones in the fœtus, it will be seen that the transverse diameter of the hips is less than that of the thorax, and also less than the bi-parietal diameter of the head, which is an arrangement advantageous for the safe passage of the child through the maternal organs. With a different disposition, so far as their dimensions are concerned, there would, after the exit of the head, be necessarily, from physical disproportion of the thorax and hips, a delay in the expulsion of these parts, which might involve oftentimes the safety of both mother and child.

There is another interesting fact connected with the extreme narrowness of the pelvis in the new-born child, and it is this: the bladder, uterus, and its appendages cannot, for want of room, be accommodated in the pelvic canal, and are consequently, for the time, lodged in the abdominal cavity; hence, the size and projection of the belly in the child and young animals.*

The Pelvis in connexion with the Soft Parts.—In examining

* Camper.

the pelvis, in relation to the soft parts with which it is invested, I shall confine myself to the pelvic cavity, brim, and outlet, for these are the only portions of the canal which have an essential bearing on the passage of the fœtus; it is solely in reference to this latter point, that it becomes necessary to advert to the soft structures at this time. On the lateral borders of the superior strait will be found the two psoas muscles, which pass down, from their origin, along the lower edges of the internal iliac muscles, and proceed under Poupart's ligament to be inserted into the trochanter minor of the femur. The presence of these muscles, on the sides of the brim,* it will be well to recollect, curtails the transverse diameter of this strait, half an inch on each side. Coursing along the margin of the psoas muscles are the iliac arteries and veins, together with the crural nerves, and lymphatics. On the posterior surface of the excavation, you will observe the rectum, the pyriform muscles, the internal iliac or hypogastric vessels, and the anterior sacral plexus of nerves, to which allusion has already been made. Laterally and posteriorly, are the sacro-sciatic ligaments, with cellular tissue and layers of fascia. In front, the bladder, the internal obturator muscles, nerves, and vessels, together with adipose cellular tissue. Immediately behind the bladder, and in front of the rectum, will be found the uterus with its annexæ.

At the inferior strait there are several small muscles, forming, as it were, a double plane, which, together, constitute the lower boundary or floor of the outlet, sustaining both the pelvic and abdominal viscera. This floor, on its median line, presents three openings, which afford passage to the rectum, vagina, and urethra. The double muscular plane is composed, superiorly, of the levator ani and ischio-coccygeal muscles; inferiorly, of the sphincter ani, transversalis perinei, ischio-cavernous, and constrictor vaginæ muscles. In addition to these, the boundary of the outlet is made up of aponeurotic coverings, a quantity of cellular tissue, the pudic vessels and nerves, together with the integuments. These parts, in fact, represent the perineum, which, during the passage of the child, undergoes an extraordinary distension, and, as has already been remarked, prolongs the parturient canal forward and upward.

Measurements of the Pelvis.—The pelvis has certain measurements or dimensions, which the student should clearly understand, for it is upon the correspondence of these measurements with those of the fœtal head that the facility or difficulty, the possibility or impossibility, of childbirth will oftentimes depend. Too close attention, therefore, cannot be given to this subject, if you desire to

* It is supposed by Velpeau, and others, that the internal iliac and psoas muscles on the sides of the brim, form a sort of cushion for the protection of the impregnated uterus against the force of concussions, and other injuries; and that this cushion likewise prevents undue pressure on the crural nerves.

comprehend the beautiful mechanism, which nature has instituted for the purpose of accomplishing the expulsion of the child through the maternal organs. The diameters of the pelvis may be divided into those of the upper strait, lower strait, and cavity.



FIG. 15.

The upper strait (Fig. 15) presents the following: 1. The antero-posterior, sacro-pubic, or conjugate, each of these names being applied to this diameter; it extends from the superior and internal portion of the symphysis pubis to the middle of the sacro-vertebral prominence, and measures four inches; 2. The transverse or bisiliac diameter, which extends from the prominence on the linea-ileopectinea (the line forming the contour or boundary of the brim) to the corresponding prominence on the opposite side; it measures, in the dried pelvis, five inches, but, for practical purposes, it yields only four inches, for the reason that it is abridged, on either side, half an inch in consequence of the presence of the *psoas magnus* muscle. You observe, therefore, that these two diameters, the antero-posterior, and transverse, make certain divisions of the superior strait; the former divides it, from before backward, into two equilateral portions; while the latter, the transverse diameter, separates this strait into two unequal portions—an anterior and posterior; the reason of the inequality of this latter division is that the respective prominences to which the transverse diameter extends, approximate more nearly the sacrum than the pubes. 3. The other two diameters of the brim are the oblique, and reach from the upper and posterior portion of the acetabulum, on either side, to the opposite sacro-iliac symphysis; each of these diameters measures four inches and a half.

Let us now turn to the measurement of the inferior strait or outlet (Fig. 16). The diameters here are also four in number: 1. The

antero-posterior, or cocci-pubic, so called because it extends from before backward, and from the summit of the pubic arcade to the extremity of the coccyx ; its usual measurement is four inches ; but,



FIG. 16.

at the time of labor, owing to the retrocession of the coccyx, it will yield four inches and a half, and sometimes more ; 2. The transverse or bis-ischiatic, receiving the latter name because it extends from the tuberosity of one ischium to that of the other ; it measures four inches ; 3. The two oblique diameters, which reach from each ischiatic bone to the central portion of the opposite sacro-ischiatic ligament ; they respectively measure four inches. The corresponding diameters of the pelvic cavity are all a fraction larger than those of the two straits.

Next we come to the measurement of the walls of the pelvis. These walls, you will recollect, are four in number—the anterior, posterior, and two lateral. The first, made up of the symphysis pubis, measures usually one inch and a half ; the posterior wall, consisting of the sacrum and coccyx, is two thirds longer ; the two lateral walls, which extend from the superior strait to the tuberosities of the ischia, measure about three inches.

These are all the dimensions necessary for practical purposes ; and you cannot but have observed, as we passed over them, one or two striking facts. In the first place, the longest diameter at the inferior strait is the direct, or cocci-pubic, while the longest at the superior strait is the oblique ; again, the posterior wall of the excavation is two thirds deeper than the anterior wall. These are extremely interesting points, the application of which will be made when discussing the mechanism by which the child effects its exit through the maternal organs.

LECTURE III.

Fœtal Head; its Regions, Diameters, Circumferences, Extremities, Sutures, Fontanelles—Sutures of the Adult and Fœtal Head contrasted—Arch and Base of Fœtal Head—The former undergoes Diminution during Childbirth, the latter does not; Reasons for—Contrast between Diameters of Fœtal Head and those of Maternal Pelvis—Deductions—Articulations of Fœtal Head—Two Movements, Extension and Flexion—Rotation. Presentation of Fœtal Head; its relative Frequency—Presentation of Vertex—Circumstances which modify the Frequency of Head Presentations—Causes of the Frequency of Head Presentations—Difference between Presentation and Position—Six Positions of the Vertex by Baudelocque—Relative Frequency of these Positions—Naegelé's Division.

GENTLEMEN—Having described the normal pelvis, in relation to its bearings on childbirth, and called your attention especially to the measurements of this canal, which, you know, constitutes the space or passage through which the fœtus makes its exit, the subject next in order is a description of the fœtal head, with its various divisions, positions, etc.; and when this is completed, I shall proceed to show you the mechanism, which nature has contrived, according to the laws of adjustment, for the safe transmission of the child through the organs of the parent. The head being the most voluminous portion of the fœtus, I shall limit myself for the present to a description of it alone; for, unless some deformity should exist, whenever the size of the head offers no impediment to its expulsion there will be found no obstruction in any other portion of the fœtal body. This remark you may at first think strange; but the shoulders, chest, and pelvis of the fœtus are so soft and compressible, that they readily find egress, when the head has preceded them.

Divisions of Fœtal Head.—The head of the fœtus, for obstetric purposes, is divided into regions, diameters, circumferences, extremities, sutures, and fontanelles; and these divisions have, to a greater or less extent, a practical bearing on its passage through the pelvic canal.* The general shape of the head is that of an ovoid.

* Dr. Clarke, of Dublin, was, I believe, the first to point out that the male fœtus is, in size and weight, in every way larger than the female: with this proposition, now universally conceded, he attempted to show that the disproportion is the cause of a more protracted labor and a greater number of still-births in the case of male children. His paper, which will well repay perusal, under the title "Observations on some causes of the excess of the mortality of males above that of females," will be found in the *Philosophical Transactions* of 1786, vol. lxxvi. p. 352. Prof. Simpson has elaborated this fact, first propounded by Dr. Clarke, in a very interesting

Regions.—They are five in number: 1. The vertex or summit; 2. The face; 3. The two lateral regions; 4. The occiput; 5. The base. These various surfaces may present at the superior strait at

memoir on the "Sex of the Child," published in the *Edinburgh Medical and Surgical Journal* for October, 1844.

The following is an analysis of the results at which Prof Simpson has arrived:—
1. A greater proportion of deaths occurs in women who have brought forth male children; 2. There are more male still-born children than female; 3. Of the children born alive and which suffer from disease or injuries consequent on parturition, there is a greater proportion among the males than females; 4. The number of children which die in utero prior to labor, is about equal among the male and female; 5. First labors are more dangerous both to mother and child than subsequent ones; 6. The complications of labor are more frequent in the birth of male than female children; 7. For the very marked differences between the difficulties and perils of male as compared with female births, there is no other traceable cause in the mechanism of parturition than the larger size of the head of the male child.

It may not be out of place to remark here, that the fourth deduction, viz. "the number of children which die in utero prior to labor is about equal among the male and female," if true, is opposed to the general belief on the subject; and it is to be regretted that the learned professor had not more ample data for the opinion expressed on this point. He is in direct opposition both to Drs. Clarke and Quetelet; the former, in the paper already alluded to, observes, "As the stamina of the male are naturally constituted to grow of a greater size, a greater supply of nourishment in utero will be necessary to his growth than to that of the female. Defects, therefore, of nourishment proceeding from delicacy of constitution or diseases of the mother, must, of course, be more injurious to the male sex." Quetelet, in his admirable treatise on man, says, "It appears beyond doubt that there is a particular cause of mortality which attacks male children by preference before and immediately after their birth." It should be stated in this connexion that the bills of mortality in the city of Hamburg [*British and Foreign Medical Review*, No. xxxviii.] give the proportion of the sexes in the cases of premature still-born children as $52\frac{1}{2}$ males to $47\frac{1}{2}$ females.

In regard to the seventh deduction, arrived at by Prof. Simpson, it does seem to me that, while admitting the influence of the size of the head as a cause of the increased mortality among male children, yet it should not be forgotten that preternatural presentations are much more frequent among male than female offspring. Conceding this to be so—and statistics sustain the fact—it is, in my judgment, right to refer to this character of presentation some portion of the acknowledged greater fatality of male births.

Dr. Veit, of Prussia [*British and Foreign Medico-Chirurgical Review*, Jan. 1856, p. 268], has recently presented some interesting facts touching this very subject. In his examination of Dr. Clarke's opinion, that the increased mortality of male infants is due to their greater size and weight, and consequently to the greater pressure upon the head, he attempts to show that this circumstance is not alone sufficient to account for the difference in mortality. He agrees with Casper, that the longer life-duration of the female sex has a deeper relation to this question; and he remarks that the difference in development between the sexes is too inconsiderable to exercise so marked an influence on the life of the child. In 2550 children, he found the difference of weight between boys and girls, whether first-born or otherwise, to be only 0.22 of a civil pound, while the difference in the circumference of the head was but six lines. Dr. Clarke on the contrary fixed the difference of measurement at 0.366 inch. Dr. Veit says that, even when the development is the same, more boys than girls are always still-born. In his analysis of the proportion of deaths, he found male

the time of labor; and I need not state that the only circumstances under which the last region or base is found there, will be when, either through an operation performed by the accoucheur, or through brutal management, the head has been separated from the trunk. The region, which presents the most commonly at the superior strait, is the vertex; and, when discussing the relative frequency of presentations, your attention shall be particularly drawn to this interesting fact.



FIG. 17.

Diameters.—The diameters of the fetal head, which have a direct bearing on its exit through the pelvis, are four in number: 1. The occipito-mental (Fig. 17), sometimes called the oblique, because in position it is oblique to the axis of the body, is the longest diameter of the head, and measures five inches and a quarter; it extends from the central portion or prominence of the occiput to the chin; 2. The occipito-frontal diameter, known as the direct, measures four inches and a quarter, and extends from the anterior portion of the frontal bone to the occiput; 3. The transverse or bi-parietal diameter (Fig. 18), measures three inches and a half, reaching from the protuberance of one parietal bone to the corresponding protuberance on the other; 4. The perpendicular or vertical diameter, which intersects the bi-parietal at right angles, and measures also three inches and



FIG. 18.

and female infant, as connected with the duration of labor, either in first or subsequent pregnancies, he presents the following conclusions: 1. The danger to the child on the birth is completed in twelve hours, is only half as great as when the labor is protracted to twenty-four hours; and that further protraction is still more dangerous. The danger is much increased when the second stage of labor exceeds two hours. When the duration of the entire labor, and the duration especially of the second stage, are equal, the male sex is more endangered than the female.

a half; it extends from the centre of the vertex perpendicularly to the base of the head.* (Fig. 17.)

Circumferences.—The two circumferences of the foetal head are: 1. The larger circumference, which separates the head into two equilateral portions, and measures from thirteen to fifteen inches; it commences at the symphysis of the chin, proceeds directly upward along the sagittal suture, and then down the central line of the occiput back to the chin; 2. The lesser circumference, which divides the head into an anterior and posterior portion, and measures from ten to twelve inches. It passes transversely across the head, commencing at one of the protuberances of the parietal bone.

Extremities.—The two extremities are: 1. Posteriorly and above, the prominence of the occiput; 2. In front and below, the chin.

Sutures.—The sutures may be said, for our purpose, to be three: 1. The coronal; 2. The sagittal; 3. The lambdoidal. The coronal suture (Fig. 19) is between



Fig. 19.

the posterior edge of the frontal, and the two anterior edges of the parietal bones. The sagittal suture (Fig. 18) extends from the frontal to the occipital bones, and runs along the internal and superior borders of the two ossa parietalia. The lambdoidal suture, on the contrary, unites the posterior borders of the parietal with the anterior borders of the occiput.

Fontanelles.—The fontanelles are two in number: 1. The anterior (Fig. 18), which is found at the junction of the coronal and sagittal sutures; it is quadri-

* Authors differ in their estimate of the diameters of the foetal head. It is not easy to do more than approximate a true average of these measurements, and this we think we have done in the text. Prof. Meigs, after an examination of one hundred and fifty heads, gives the following as the result of his observation: occipito-mental $5\frac{1}{2}$ inches; occipito-frontal $4\frac{1}{2}$; bi-parietal $3\frac{1}{2}$.

In the Amer. Jour. of Med. Sciences for Jan., 1860, Joseph K. J. Van Pelt, M.D., gives measurements made by himself of seven hundred foetal heads at term. For this purpose he employed the cephalometre of Stein. In 646, the occipito-mental diameter averaged $5\frac{1}{4}$ inches; the occipito-frontal measured $4\frac{2}{3}$ inches; the bi-parietal diameter measured $3\frac{2}{3}$ inches.

Of 166 crania measured by Addinell Hewson, M.D., the average occipito-mental was 5.25; occipito-frontal, 4.68; bi-parietal, 3.60.

It would, therefore, seem, for some reason yet unexplained, that authentic measurements in this country give larger diameters for the most part, especially the occipito-frontal and bi-parietal, than foreign measurements.

lateral in shape, membranous, and smooth. This fontanelle is what the old women call the "opening of the head." There is felt at this point a pulsation, which the ignorant oftentimes imagine to be the result of disease, but which is nothing more than an arterial throbbing. As ossification advances, this membranous expansion becomes consolidated into bone. 2. The posterior fontanelle (Fig. 18), which is at the junction of the sagittal and lambdoidal sutures. It is usually, at birth, ossified—it is triangular in shape, and more or less rough.

It is important to recollect the characteristic differences between these two fontanelles, for they, as well as the sagittal suture, constitute the guides by which you are to distinguish the individual positions of the vertex. For example, the respective positions of the fontanelles will indicate whether the occiput regards one of the anterior or posterior points of the pelvis; while the direction of the sagittal suture will disclose whether the head rests obliquely or otherwise.*

Sutures of Fœtal and Adult Head.—Although I have employed the term suture, yet you will at once perceive a striking contrast between the sutures of the fœtal and those of the adult head. In the latter, they are serrated, and perfect in their organization, giving to the bones of the cranium a consolidation and immobility essential for the due protection of the brain. In the former, on the contrary, you observe a very different construction; the sutures, instead of uniting the bones by a species of dovetailing, present an arrangement by which these bones—and this is more remarkable in the two ossa parietalia—are permitted to overlap each other. In this difference of arrangement in the adult and fœtal head is exhibited another of those numerous evidences of design so constantly presenting themselves to the attention of the student of medicine; evidences which, while they demonstrate the great truth that a supreme intelligence has directed the architecture of the human fabric, disclose the provident care which has been exercised in its adaptation to the special wants of the individual. When treating of that subject, we shall show you that the arch of the fœtal cranium, during the passage of the head through the pelvis, oftentimes becomes diminished in its transverse diameter; and this especially occurs in cases in which the head is a little larger than usual; this diminution is accomplished, without detriment to the

* An interesting fact has recently been communicated, touching the occlusion and ossification of the anterior fontanelle, by Dr. Roger, physician to the Hôpital des Enfants, in Paris. He is positive, as the result of his researches on this subject, that the cephalic souffle can be recognised only when there is no bony obstacle between the ear and the brain; in the examination of nearly three hundred infants, the fontanelle was never closed before fifteen months, and never found open after the age of three years.—[L'Union Médicale in 1859.]

child or mother, by the overlapping of the two parietal bones. You see, therefore, that the lessening of the size of the head could not be accomplished, if the sutures in the fœtus were constructed similarly to those in the adult.

There is also another interesting point connected with the difference in the construction of the arch and base of the fœtal head. The former becomes, I have just stated, diminished, and there is no inconvenience from it, for the upper portion of the brain is not essential to the maintenance of life; the base of the fœtal skull is firm in its construction, sufficiently so, at least, to resist pressure, and, therefore, does not, like the arch, undergo diminution. If you inquire why this is so, the answer is found in the important circumstance that the base of the brain, especially the medulla oblongata, is so directly connected with life that it cannot be disturbed without more or less hazard; and hence this peculiarity of construction.

There is an essential practical fact, much insisted upon by Capuron, directly deducible from what has just been said touching the difference in the compressibility of the arch and base of the fœtal head; and it is this—the difference in the width of the arch and base points out the exact amount of diminution which it is possible for the former to undergo, in order to facilitate delivery; for should the disproportion between the maternal pelvis and base of the cranium be such as to prevent the passage of the base, the compression of the arch would result in no benefit, so far as the delivery of the child is concerned.

Diameters of Fœtal Head and Pelvis.—Contrast.—In describing the respective diameters of the fœtal head and adult female pelvis, you will have noticed a very interesting point, namely, that the former presents one diameter, the occipito-mental, measuring five inches and a quarter, which is larger than any diameter of the pelvis; and again, it has another diameter, the occipito-frontal, yielding four inches and a quarter, which is also larger than the transverse and bis-ischiatic diameters of the upper and lower straits, each of which measures only four inches. Here, then, is the head of the fœtus possessing certain larger dimensions than the maternal pelvis, the space through which it has to pass. This at once involves apparently the physical difficulty—of a *larger body traversing a smaller space*; nature, however, appreciates this difficulty, and has most effectually—as will be shown in the succeeding lecture—removed it by the institution of a mechanism, not only perfect, but worthy of your profound admiration.

Articulations and Movements of Fœtal Head.—Before proceeding further, it is important that your attention should be directed to the articulations of the fœtal head. It, like the adult head, enjoys two movements: 1. That of flexion and extension; 2. That of rotation, or the lateral movement. In both the adult

and fœtus, these movements are respectively the result of the same kind of articulation. The condyloid processes, on either side of the foramen magnum of the occipital bone, are received on the superior articulating surfaces of the atlas, or first cervical vertebra; this junction constitutes the articulation known as the occipito-atloïdien, and it is through it that the head is enabled to perform the movement of flexion and extension. The second movement, that of rotation, results from the articulation subsisting between the odontoid process of the second cervical vertebra—the vertebra dentata—and the internal surface of the atlas. This movement enjoys a much greater degree of latitude in the fœtus than in the adult. It oftentimes extends beyond the fourth of a circle, but, in these cases, the excess of rotation is undoubtedly enhanced by the participation of the spinal column, which possesses much greater mobility in the fœtus than in more advanced life, for the reason of its cartilaginous structure.* The importance of these two movements you will more readily appreciate, when describing the manner of the head's exit through the pelvis.

Frequency of Head Presentations.—In the Maternité of Paris, among 84,395 births, at full term, the head presented 82,164 times; and that you may appreciate the comparative frequency of the vertex or summit presentations, contrasted with the other regions of the head, in these 82,164 cases the vertex was found at the superior strait—81,806 times.† Dr. Churchill‡ says, in 327,802 cases collected by him, the head presented 321,502 times. In 219,253, reported by Riecke, the vertex presented 214,134 times. You observe, therefore, from these statistics, which, in the main, agree with those derived from other sources, that the head, out of all proportion to any other part of the fœtus, presents most frequently at the superior strait.

It is, however, a fact worthy of note that this extraordinary proportion refers only to the full period of utero-gestation; for Dubois, in his researches on this subject, has found that of one hundred and twenty-one children, born before the seventh month, sixty-five presented the vertex, fifty-one the pelvic extremity, and five the shoulder. Thus, previous to the seventh month, the presentation of the pelvic extremity is to that of the head as four to five, while, at the completion of pregnancy, it is as one to twenty. It has also been shown, that the life or death of the fœtus exercises respectively a decided influence on the kind of presentation. In ninety-six children, born dead in the latter months of gestation,

* It is stated by Madame La Chapelle and M. Dubois, that they have observed several instances in which the face was turned almost directly backward, such was the latitude of the rotary movement, without at all compromising the safety of the child.

† Moreau, p. 146.

‡ Churchill's Midwifery, p. 190.

seventy-two presented the head, twenty-two the pelvic extremity, and two the shoulder; so that the presentations of the pelvic extremity relatively to those of the head, were as one to three and a quarter. In forty-six, dead and delivered at the seventh month, twenty-one came by the head, twenty-one by the pelvic extremity, and four by the shoulder. In seventy-three living children, born at the seventh month, sixty-one presented the head, ten the pelvic extremity, and two the shoulder. It would, therefore, appear that, at the seventh month, in fœtuses born alive, the presentation of the head compared with that of the pelvic extremity, was as six to one, and when the fœtuses were dead, one to one.

Again: according to Scanzoni,* there were, in the Lying-in Hospital at Prague, during a period of six years, 12,539 deliveries, of which twenty-one occurred previously to the seventh month; of these twenty-one, only six presented the head, while there were fifteen pelvic presentations. In twenty-four cases of abortion, noted by Scanzoni in his private practice, fourteen presented the pelvic extremities. He also observed that, in premature births, at a later period of pregnancy, pelvic presentations were frequent, and more especially when the fœtus was born dead.

Cause of the Frequency of Head Presentations.—Various theories have been suggested in explanation of the remarkable relative preponderance of this form of presentation; and some of the cleverest minds in the profession have, within comparatively a few years, been engaged in the discussion of the question. The old theory, which, for a long time, was accepted as the true exposition, inculcated that the fœtus, until a certain period of gestation, say the seventh month, remained in the uterus with its head upward; at this time, it made a somerset, which resulted in bringing the head to the *os uteri*, and placing the breech at the fundus of the organ. Such was the teaching of Hippocrates, Galen, and others. In the sixteenth and seventeenth centuries, a new hypothesis was advanced, giving to the fœtus a certain instinctive or voluntary power, which caused it at the latter period of pregnancy to turn its head downward. One of the principal supporters of this view was Mauriceau. He maintained that the fœtus, toward the close of gestation, places its head in correspondence with the mouth of the womb, in order that it may the more readily effect its egress.†

Without enumerating other conjectures in the attempted explanation of the general fact as to the frequency of head presentations, it may be stated that, in our day, there are three principal theories, which have more or less occupied the professional mind on the sub-

* Lehrbuch der Geburtshilfe. 1855. p. 92.

† L'enfant tourne donc de cette manière sa tête vers les derniers mois de la grossesse, afin seulement d'être disposé être plus facilement mis hors de la matrice au temps de l'accouchement.—*Traité des Maladies des Femmes Grosses*, t. 1, p. 266.

ject, viz. Physical gravitation, voluntary or instinctive action of the fœtus, and, lastly, reflex or excito-motory movements of the latter.* These various hypotheses have been discussed with much ability by their respective advocates. The theory of physical gravitation has had many supporters, and a very interesting paper sustaining this view has recently appeared from the pen of Dr. Matthews Duncan, who, within the last few years, has made several important contributions to obstetric science. Professor Paul Dubois, in revival, as it were, of the notion entertained by Mauriceau and his school, published, in 1832, an essay* referring the frequency of head presentations to an instinctive or psychical influence exercised by the fœtus. This essay has deservedly attracted much attention. Finally, we have the theory of reflex or excito-motory movements as the cause of the attitude of the fœtus in utero, ably advocated by Prof. Simpson.† If I may be permitted to express an opinion on this controverted question, I should say that, in lieu of any one of these influences being *per se* sufficient to explain the position of the fœtus in the womb, the fact is due to a combination of circumstances not yet, perhaps, properly comprehended.‡

The cardinal point, however, for you to remember is, that usually the head is found at the time of labor at the superior strait of the pelvis, and whatever may be the true explanation of the cause, whether vital or mechanical, you cannot fail to perceive in this arrangement another evidence of the wise provisions of nature. You have been told that, *cæteris paribus*, the head is the most voluminous portion of the fœtus, and hence the advantage of its preceding in childbirth the other parts of the fœtal body; it is, moreover, true that, in the presentation of the pelvic extremity at the time of parturition, as a general rule, whenever difficulty occurs in the delivery, it is not until the entire body has been expelled, the obstacle being due to the passage of the head. This will be shown more fully, when describing the mechanism of labor in pelvic presentations.

Presentation and Position.—It is not only important that you should appreciate the frequency of head presentations, but it is also necessary to understand in what manner the head may present itself at the upper strait. This brings me, for a moment, to the consideration of the difference between a *presentation* and *position* of the fœtus. In obstetric language, presentation signifies the particular portion of the fœtus found at the upper strait at the time

* Mémoire sur la Cause des Présentations de la Tête pendant l'Accouchement et sur les Déterminations instinctives et volontiers du Fœtus Humain.

† Simpson's Obstetric Works, vol. ii., p. 102.

‡ I should not omit to mention that Scanzoni refers the frequent presentation of the head to the shape of the uterus, and the mode of its development during pregnancy.

of labor, whether it be the head, feet, shoulder, or any other part. The *position*, on the contrary, is meant to define the particular situation of the presenting part. The distinction, you perceive, is obvious, and should be borne in memory, in order that what we shall now have to say touching the various positions of the vertex may become intelligible. I shall, for the present, limit myself to the positions of the vertex, reserving the other regions of the head for future consideration.

Positions of the Vertex.—There is not only a remarkable discrepancy among authors as to the number of vertex positions, but also as to the order of their frequency. If, for example, we are to be guided by some of these writers, we shall find the vertex situated at the superior strait, according to one of them in eight, to another in twelve, and to a third in sixteen different positions. All this is well enough, perhaps, for the closet, but it cannot, in my opinion, subserve any practical interest. It does seem to me, that our great object should be to simplify, and not complicate science by fictitious and useless classifications; they only tend to burden the mind, and confuse thought. The accoucheur, in the lying-in room, is in need of substantial facts and wholesome principles; he cares not for barren hypothesis, for he knows that it cannot aid him in the hour of peril. His mind should be stored with lessons of truth, which will constitute so many guides to point out the course to be pursued, when embarrassed and circumvented by difficulty. Hence, I shall not weary you with an array of the numerous divisions which different writers have made of vertex positions, together with their varieties. My object is to economize your time, without, however, restricting your knowledge; and it shall be my aim, in these lectures, to lay before you principles, which you will recognise at the bedside of your patient, and not idle away the hour in the vain and unprofitable agitation of crude and unsupported theory.

I shall, therefore, limit myself to the positions of the vertex, with the relative frequency of each, as defined by what may be termed, touching this question, the two great obstetric schools—the one represented by Baudelocque, the other by Naëgelè, Paul Dubois, and Stoltz. Were I to continue the history of the divisions, as suggested by some other writers, it would, I am quite sure, not only be without profit, but would, I think, afford satisfactory evidence that these very writers had fallen into a species of transcendentalism, which, for the healthy progress of science, and the benefit of the sick-room, had, in my opinion, better have been avoided. Transcendentalism in our profession, like transcendentalism in religion, commerce, or government, is not only an absurdity, but is oftentimes fraught with danger.

The School of Baudelocque.—According to Baudelocque, there

are six different positions of the vertex at the superior strait; and in order that you may clearly comprehend them, I shall ask you, in the first place, to recall to memory what we have already stated as to the anterior and posterior divisions of the pelvis, and the six cardinal points found in these two divisions of the pelvic canal. In drawing a line transversely across the superior strait, you divide the pelvis into an anterior and posterior portion; you have, on the former, the right and left acetabula, and the symphysis pubis; while on the latter, are observed the three posterior points, namely, the right and left sacro-iliac symphyses, and the sacro-vertebral prominence; now these six points, taken in connexion with the occiput and os frontis of the foetal head, will give the six vertex presentations as follows:

In the first, the occiput corresponds with the left acetabulum, and the os frontis with the opposite sacro-iliac symphysis.

In the second, the occiput is at the right acetabulum, the os frontis at the left sacro-iliac symphysis.

In the third, the occiput is at the symphysis pubis, the os frontis at the sacro-vertebral prominence.

In the fourth, the os frontis is at the left acetabulum, and the occiput at the right sacro-iliac symphysis.

In the fifth, the os frontis is at the right acetabulum, and the occiput at the left sacro-iliac symphysis.

In the sixth, the os frontis is at the symphysis pubis, the occiput at the sacro-vertebral prominence.

You cannot have failed to notice, from what I have just said, that the fourth, fifth, and sixth presentations are the direct opposites of the first, second, and third, and that, while the three latter are obtained by placing the occiput respectively at the three anterior points of the pelvis, you find the three former, by placing at these same points the os frontis.

Let us next consider the relative frequency of these vertex positions, in accordance with the statistics as recorded by Baudelocque himself, and some of his disciples. In 10,322 vertex presentations, 8,522 occupied the first position, 1,754 the second, two the third, twenty-five the fourth, nineteen the fifth, and one the sixth.*

With Madame La Chapelle, in 20,698 vertex cases, 15,809 were in the first position, 4,659 in the second, 164 in the fourth, and sixty-six in the fifth.†

Madame Boivin states that, in 19,585 vertex presentations, the occiput was found at the left acetabulum (first position), 15,693 times; at the right acetabulum (second position), 3,682 times; at the symphysis pubis (third position), six times; at the right sacro-iliac symphysis (fourth position), 109 times; at the left sacro-iliac

* *L'Art des Accouchemens*. Par I. L. BAUDELLOCQUE. Tome i., p. 305.

† *Pratique des Accouchemens*. Par Madame LA CHAPELLE. Tome ii., p. 508.

symphysis (fifth position), ninety-four times; at the sacro-vertebral prominence (sixth position), but twice.

If these statistics prove anything, they unequivocally establish that, in vertex presentations, the very general rule is that the occiput is either at the left or right acetabulum (first or second position), and that when it is either at the symphysis pubis, the right or left sacro-iliac symphysis, or at the sacro-vertebral prominence, it is so, comparatively at least, as a rare exception. The authorities, which I have cited in support of these data, are both eminent and reliable, and yet, when their deductions are contrasted with the statistics of the opposite school—equally eminent and reliable—we shall be struck with the extraordinary, and apparently irreconcilable discrepancy in their conclusions; and as illogical as it may at first sight seem, that two results, directly contradictory the one to the other, can both be right, yet I am disposed to think that the fact can be demonstrated. Before, however, attempting to reconcile the conflicting statements, it is proper that the testimony of the other side should be presented.

The School of Naëgelè.—The opinion advanced by Baudelocque with regard to the relative frequency of the positions of the vertex had received the very general concurrence of obstetric writers, until contested by Naëgelè, who, in 1818, published his views on the mechanism of parturition. While Naëgelè agreed with Baudelocque as to the positive frequency of the first position of the vertex—the occiput in correspondence with the left acetabulum—yet he maintained that the second most frequent position was *not with the occiput to the right acetabulum, but to the right sacro-iliac symphysis*. Here, then, was a remarkable discrepancy of sentiment, and it was not long before it attracted the consideration of the learned in obstetric science. The distinguished Professor of Heidelberg, after a rigorous examination of the subject at the bedside, arrived at the following results: In one thousand instances of vertex presentation, for example, he found the occiput at the left acetabulum (first position) six hundred and ninety-eight times; at the right acetabulum (second position of Baudelocque) once; at the right sacro-iliac symphysis (fourth position of Baudelocque) two hundred and ninety-eight times; at the left sacro-iliac symphysis (fifth of Baudelocque) three times.

Dubois and Stoltz, who were among the first to examine practically the new view as propounded by Naëgelè, have given the results of their investigation, which are radically in confirmation of those of the German Professor. Dubois, in 1913 presentations of the vertex, observed the occiput at the left acetabulum (first position) 1339 times; at the right acetabulum (second position) fifty-five times; at the right sacro-iliac symphysis (fourth position) four hundred and ninety-one times; at the left sacro-iliac symphysis

(fifth position) twelve times. The material difference between Dubois and Naëgelè, it will be seen, is in the position of the occiput at the right acetabulum, the latter making it but one in 1000, while with the former it was fifty-five in 1913. This, however, does not affect the main proposition, with regard to which there is an entire concurrence, viz. that the second most frequent position of the vertex is, *when the occiput is turned toward the right sacro-iliac symphysis* (the fourth of Baudelocque). So much for France, in agreement with the opinion of Naëgelè; and to the names of Stoltz and Dubois, may be added those of Cazeaux, Jacquemier, and others.

Next, let us turn to Great Britain, and see whether this revolution of opinion—originated by the eminent German accoucheur—has enlisted any supporters in that commonwealth. Prof. Simpson, in 1846, in a clinical lecture* on *head-presentations*, sustains, with his usual ability, the views of Naëgelè. He says, very emphatically, "I find that in one out of every three or four cases among my private patients, I meet with this position of the head—the occiput to the right sacro-iliac symphysis. It is so very frequent, that I have repeatedly seen two or three instances of it occur in succession." The statistics gathered by Dr. Martin Barry, House-Surgeon to the Edinburgh Maternity Hospital, present the following results: In three hundred and twenty-five cases of cranial presentations, carefully observed by him in that institution, the occiput was directed to the left acetabulum two hundred and fifty-six times; to the right acetabulum once; to the right sacro-iliac symphysis seventy-six times; to the left sacro-iliac symphysis twice. It may also be stated that Naëgelè's opinion is concurred in by Drs. Rigby, Murphy, and Tyler Smith. Dr. Ramsbotham† admits that "the right posterior occipito-iliac positions are far more common than before supposed." Lastly, Dr. Churchill,‡ the distinguished representative of the Dublin School of Midwifery, observes, "The more closely the opinion of Naëgelè has been tested by experience and careful observation, the more clear does its correctness appear."

Now, with the deductions of the two schools before you, differing, as they do, so widely, the inference naturally is, that if one be right, the other is wrong. I think, however, that the discrepancy is due altogether to the time of labor at which these results were respectively reached. Baudelocque, for instance, judged of the relative frequency of the occipito-anterior positions, from the position the head occupied after its descent to the vulva. Naëgelè, on the contrary, began his investigations at the very moment of par-

* Northern Journal of Medicine, April, 1846, p. 216.

† Ramsbotham's System of Obstetrics, p. 206.

‡ Churchill's System of Midwifery, p. 203.



FIG. 20.



FIG. 21.



FIG. 22.



FIG. 23.

turition, when the head had undergone little or no departure from its original position. But the question arises—admitting this difference of time as to the period of their respective investigations—how does it happen that one school should find, at the commencement of labor, the occiput, second in frequency, in correspondence with the right sacro-iliac symphysis; and the other school, after the descent of the head, should recognise the occiput to be in accordance with the anterior section of the pelvis? The solution of this inquiry is a key to the problem, and will, I think, satisfactorily explain it.

Naëgelè, while maintaining that the right occipito-sacro-iliac position is second in frequency, admits that it is so only as a primitive position; and he shows that, as labor advances, the descent of the head is such that, as a very general rule, both the right and left posterior occipito-sacro-iliac positions become converted into one or other of the anterior-occipital. For example, the posterior right is converted into the anterior right, while the posterior left is changed into the anterior left; in other words, the head undergoes a movement of rotation, which turns the occiput from the posterior to the anterior section of the pelvic canal.

The following statistics, in proof of this conversion, are not without interest: In 1254 occipito-posterior positions mentioned by Naëgelè, in only seventeen instances did the occiput disengage along the posterior wall of the pelvis; and, in each of these, the exception could be explained by the greater capacity of the pelvis, numerous previous labors, or rupture of the perineum. In twenty-six occipito-posterior positions, observed by Stoltz, the occiput underwent the anterior conversion in all. In five hundred and three, recorded by Dubois, the occiput was expelled posteriorly in thirty-nine. In the seventy-six cases as recorded by Dr. Martin Barry, in two only did the occiput fail to rotate forward. The general sentiment of obstetricians, at the present day, appears to be in concurrence with the views of Naëgelè* and his school, viz. that the right posterior occipital position is the second in the order of frequency only as a primitive position; and with this concurrence I heartily accord.

Author's Classification.—In order to simplify the positions of the vertex, we shall reject the third and sixth of Baudelocque, for the reason of their extreme rarity, and because, on this account, they should be regarded as altogether exceptional, and shall adopt the following classification:

* A late writer, however, R. U. West, M.D., in an exceedingly interesting memoir, contests the truth of Naëgelè's views. Dr. West's opinion is founded on observations made by him in four hundred and eighty-one deliveries. He agrees with the old school as to the vertex positions.—*Cranial Presentations and Cranial Positions*, etc. By R. U. West, M.D. London, 1857.

First Position.—The occiput in correspondence with the left acetabulum, and the os frontis at the opposite sacro-iliac symphysis. (Fig. 20.)

*Second Position.**—The occiput at the right acetabulum, the os frontis to the left sacro-iliac symphysis. (Fig. 21.)

Third Position.—The os frontis at the left acetabulum, and the occiput at the right sacro-iliac symphysis. (Fig. 22.)

Fourth Position.—The os frontis at the right acetabulum, and the occiput at the left sacro-iliac symphysis. (Fig. 23.)

In the succeeding lecture, I shall describe the mechanism by which, in the four positions of the vertex, is insured the safe passage of the child through the maternal organs.

* It must be distinctly borne in mind that this is the second position, not in the order of frequency, for it has already been shown that the third position (the right posterior occipito-iliac) is next to the first in frequency, but this classification of first, second, third, and fourth, is made merely to avoid confusion. For example, the occiput is placed first at the two acetabula, and afterwards at the two sacro-iliac symphyses, without reference to the relative frequency of its apposition with these various points of the pelvis, always excepting, however, the left occipito-acetabular, which, out of all comparison, is the most frequent of the four vertex positions.

LECTURE IV.

Mechanism of Labor—Its Importance—Mechanism in the first Vertex Position—Left Occipito-acetabular—Position of the Fœtus—Relations of the Head to the Pelvis—Necessity for a Change in these Relations—Movements imposed upon the Head—Flexion, Descent, Rotation, Extension, and External Rotation—Object and Causes of these Movements—Proof that these Movements occur—Gerdy's Explanation of External Rotation—Mechanism in the Second Position—Right Occipito-acetabular—Mechanism in the Third Position—Right Posterior Occipito-iliac, the Second in Frequency, according to Nægelè—Conversion of the Posterior Occipital into Anterior Occipital Positions—How this Conversion is accomplished—Mechanism in the Fourth Position—Left Posterior Occipito-iliac—Necessity of an accurate Knowledge of the Principles on which the Mechanism of Parturition is founded—The practical application of this Knowledge at the Bedside.

GENTLEMEN—You are now prepared to appreciate the interesting mechanism by which the transmission of the child, through the bony and soft structures of the parent, is accomplished. The mechanism of labor may be defined to be a combination of movements founded upon the principle of adaptation, and intended, through the proper adjustment of the respective diameters of the fœtus to those of the pelvis, to facilitate the passage of the former into the world. In the whole range of obstetric science there is no topic more worthy of profound study—none certainly which involves more deeply the lives of both mother and child. One defective link in the chain of movements necessary to the perfection of this mechanism—unless promptly supplied by judicious interposition—and the saddest results may ensue. Therefore, I ask your attention while I endeavor to present to you, in the simplest possible manner, the various stages of this adaptation, a knowledge of which is as necessary to the obstetrician as is the compass to the navigator. I shall, for the present, limit myself to a description of the mechanism of labor as connected with the four positions of the vertex, reserving the other positions of the fœtus to a future and more appropriate period of the course.

Mechanism in the First Vertex Position—Left Occipito-acetabular.—In this position (Fig. 20), you will remember, the occiput or posterior fontanelle corresponds with the left acetabulum, while the os frontis or anterior fontanelle regards the opposite or right sacro-iliac symphysis. The general relations of the fœtus are such, that its dorsal surface is to the left and in front; its anterior

plane to the right and posteriorly ; its right lateral surface to the right and forward ; its left lateral surface to the left and backward, with the pelvic extremities toward the fundus of the womb. For the proper understanding of what we shall presently say, it is absolutely essential that you should be under no error as to the exact relations, in this first vertex position, which the head of the fœtus bears to the pelvis of the mother at the superior strait. In the first place, the sagittal suture occupies the left oblique diameter of the pelvis ; the occipito-mental diameter is oblique to the axis of the superior strait, and, at the same time, the perpendicular or vertical diameter is in correspondence or parallel with this same axis ; the occipito-frontal and transverse diameters of the head accord respectively with the two oblique diameters of the strait.

If, now, you attentively consider these relations of the fœtus to the pelvis, it will at once become manifest that, for the head to pass through the pelvic cavity, some change in its position is necessary, and for the following reasons :—1. The occipito-frontal diameter of the head measures four inches and a quarter, and to this is to be added the thickness of the scalp, hair, and walls of the uterus, which, together, will make up nearly, if not quite, a quarter of an inch—this increase, therefore, will give to the occipito-frontal diameter four inches and a half, or within a fraction of it ; as a consequence, this diameter would have, without alteration in the position of the head, to pass through the oblique diameter of the brim, which, it is not to be forgotten, measures only four inches and a half. This, then, would necessarily involve the physical objection of a body of four inches and a half traversing a space of precisely the same dimensions. 2. The occipito-mental diameter of the head, giving five inches and a quarter, is, in this first position of the vertex, oblique to the axis of the superior strait ; and as it exceeds any diameter of the pelvis, its descent into the pelvic cavity is impossible, unless through a change in its relations, which change, we shall show you, will be such as to bring it in parallelism with the axis of the upper strait, thus affording every facility for its passage into the excavation.

Such, therefore, is usually the condition of things relatively to the fetal head and maternal pelvis at the commencement of labor ; and you plainly perceive the necessity for a modification in these relations.* Nature, cognizant of the difficulties just enumerated,

* It sometimes occurs that the chin will be in more or less approximation with the sternum before the commencement of labor—but that this is the general rule, as is maintained by some writers, is, I think, altogether erroneous. The flexion of the head, as I shall endeavor to prove, is the result of certain mechanical forces—and these are wisely brought into operation for the purpose of overcoming the physical disproportions between the head of the fœtus and maternal pelvis, as they ordinarily exist before the commencement of the parturient effort. It is stated by Jacquemier, that, so far from the head undergoing the movement of flexion, it frequently descends

imposes upon the head of the child a succession of movements, which, when completed, exhibit the mechanism of labor in all its perfection. These movements are—*flexion*, *descent*, *rotation*, *extension*, and, lastly, what is now denominated *external rotation*, as a substitute for the term formerly employed—*restitution*.

Flexion.—Responsive to the contractions of the uterus, the position of the head becomes changed; the chin is brought in close approximation with the sternum, constituting the movement of flexion,* and it is interesting to contemplate how immediately the relations of the pelvis and head become modified. As soon as



Fig. 24.

the chin is thrown upon the sternum, the occipito-mental diameter is made parallel to the axis of the superior strait (Fig. 24), the occipito-frontal is oblique to this same strait, while the perpendicular and transverse diameters of the head are placed in apposition respectively with the two oblique diameters of the brim. This simple movement, then, of flexion, does what? Why, as you have this instant seen, it so changes the relations of the head to the pelvis, that it not only removes the physical difficulties of which we

have spoken, but, in lieu of these difficulties, it substitutes the greatest possible facility for the descent of the head, by placing the

to the perineal strait unchanged, without occasioning any obstacle to its expulsion. I hold this statement to be, as a general rule, altogether an illusion; nor can the head, without the previous movement of flexion, pass into the pelvic cavity, except when the head itself is unusually small, or the pelvis unusually capacious.

* The head, it should be recollected, presents in such way that, instead of the vertex being, as it were, perfectly plumb, it is slightly turned or inflected laterally, so that at the very beginning of labor, as soon as the head can be distinctly recognised, that portion of it with which the finger comes directly in contact (in the first vertex position) will be the right os parietale, and the sagittal suture will be detected occupying the oblique diameter, but slightly backward in the direction of the sacrum. It is, I believe, generally supposed that the credit of calling attention to this circumstance, is due to Naëgelè; but he was anticipated by that sound observer, Gardien, who distinctly says, "at the commencement of labor, one of the parietal bones usually presents." If the inclination of the axis of the superior strait be duly considered, it will be readily seen that the head, which is to accom-

smallest diameters of the latter in apposition with the largest at the superior strait. What a combination of wisdom and intelligence in this movement of flexion, and how emphatically does it demonstrate the ample provisions, when not interrupted, which nature is constantly making for the wants of the economy!

But you may be disposed to doubt that the head becomes flexed, or, at least, you may desire some demonstration of the fact. You have a right to assume nothing as granted which is susceptible of proof; if you pursue science by the assertion of this right, with an earnest demand for its fulfilment, the result cannot but be auspicious both for science and yourselves, for, under such circumstances, the former will progress with a healthy growth, while you, instead of having your minds filled with rubbish, will have gathered substantial principles, which will guide you to truth.

Now for the demonstration: if, at the commencement of labor, before the head has become flexed, you institute a vaginal examination in the first position of the vertex, you will find the posterior fontanelle or occiput at the left acetabulum, and the anterior fontanelle or os frontis at the right sacro-iliac symphysis; the sagittal suture you will distinctly trace, coursing along the oblique diameter of the brim from left to right, looking a little toward the sacrum, because of the slight lateral inflection of the right os parietale, to which allusion has already been made.* This, therefore, is the condition of things at this time; the pains come on, the labor has fairly set in, and is progressing; after the lapse of a little time, a second examination is made, and what do you discover? The occiput or posterior fontanelle, instead of corresponding with the left acetabulum, lies diagonally in the pelvic excavation, while the sagittal suture is not in correspondence with the oblique diameter of the brim from left to right, but is placed obliquely from below upward. Admitting, gentlemen, what I have just stated to be true—and the lying-in room will abundantly corroborate it—what, allow me to ask, could have accomplished this change in the relations of the head and pelvis, except the movement of flexion? The next inquiry is, how is this movement of flexion produced?

modate itself to the direction of this axis, should itself describe an oblique line, and present one of its sides, instead of being placed perpendicularly. “ Dans le premier moment du travail, c'est ordinairement un des pariétaux qui se presente,” etc.—*Traité d'Accouchemens*, par M. GARDIEN, t. ii., p. 290.

* The experience of the lying-in room will prove that the sagittal suture may be felt by the finger, but occasionally it will be impossible to detect either the anterior or posterior fontanelle; therefore, under these circumstances, although the general fact will be ascertained, viz. that the head occupies an oblique position, yet it cannot be known thus early, whether the occiput is at the left acetabulum or at the opposite point of the pelvis, because the fontanelles are alone the proofs of this latter fact.

You will not have forgotten the two articulations of the foetal head; one for flexion and extension, the other for rotation; and you will recall to memory that the condyloid processes on either side of the *foramen magnum occipitale* are not at the centre of the base of the head, but are more posteriorly than anteriorly, thus necessarily giving the same posterior direction to the occipito-atloidien articulation, on which the movement of flexion and extension depends. At the commencement of labour, the uterus, under the influence of its contractions, exerts a force, the object of which is to cause the expulsion of the child through the pelvis; the force is so displayed as to be parallel, or nearly so, to the axis of the superior strait, and, consequently, more or less parallel to the axis of the child's body, and that of the uterus itself. This force, you are to bear in mind, is concentrated upon the head of the foetus, and, for a time at least, is resisted by the neck of the womb, and, to a certain extent, by the brim of the pelvis. If, therefore, you will consider, for a moment, these circumstances, you will, I apprehend, encounter no embarrassment in comprehending the influences which contribute to the movement of flexion. They are: 1. The contractions of the uterus; 2. The position of the occipito-atloidien articulation; 3. The resistance of the os uteri and pelvic brim.

Descent and Rotation.—You have now seen that the first movement which the foetal head undergoes is flexion, and you



FIG. 25.

appreciate its causes and objects. As soon as the head becomes flexed, it occupies an oblique or diagonal position in the pelvic cavity (Fig. 24), and unless this be changed it will be physically impossible for it to make its exit through the vulva, because of the disproportion between its diameters and those of the pelvis. Hence, the necessity for another movement, which is that of rotation, consisting of a demi-spiral turn, equaling nearly th

a circle.

consequence of which is to change the position of instead of resting diagonally in the excavation the occiput is brought to the symphysis :

the face directed to the hollow of the sacrum. The object, therefore, of this movement of rotation is to overcome the physical difficulty of the head passing through the inferior strait, while continuing diagonally, by placing it in the direct position, viz. with the occiput corresponding with the symphysis pubis, and the face with the concavity of the sacrum. You may, however, very properly ask—how is this movement of rotation accomplished? When describing the bones, your attention was particularly directed to the anterior and posterior inclined planes of the pelvis. After the movement of flexion has taken place, the head, urged by the impelling power—the contracting uterus—descends into the excavation, and, in its descent, the occiput is brought in contact with the inclined planes in front, while the forehead is in apposition with the posterior; the contact of the head with these planes results, under the continued impulsion of the uterus, in the rotary movement to which allusion has just been made.

I think, therefore, it may be said, that the rotation of the head is due: 1. To the peculiar direction of the planes; 2. To the resistance offered by the walls of the excavation; 3. To the contractions of the uterus. Some high authorities are disposed to doubt that the inclined planes exert any influence in causing the rotation of the head, and maintain that the latter does not undergo this change of position until it has reached the floor of the pelvis; they refer, therefore, the rotary movement, not in part to the peculiar direction of the planes, but to the resistance offered to the head by the perineum and adjacent structures, together with the contractions of the uterus.

To this view, there is, according to my experience, an insuperable objection, and it is this—*rotation, as a general rule, commences before the head reaches the inferior strait.* The proof of this latter fact is within the reach of any practitioner at the bedside of his patient, provided he have experience and tact sufficient to recognise the evolutions of the foetal head in its progress through the pelvic canal. Again: if we deny the action of the inclined planes, how is rotation to be explained in certain cases in which, from numerous antecedent deliveries, or other circumstances, such, for example, as previous laceration of the perineum, there is such an amount of relaxation in the parts, as to render any attempt at resistance utterly negative?

Extension.—When the head has been rotated, the relation of its diameters to those of the lower strait is as follows: the bi-parietal or transverse diameter of the head, measuring three inches and a half, corresponds with the transverse or bis-ischiatic of the strait, which is four inches; while the occipito-frontal diameter of the head, four inches and a quarter, rests in the direct or cocci-pubic diameter of the strait, which, under ordinary circumstances, is four

inches, but, at the time of labor, owing to the regression of the



FIG. 26.

coccyx, increases from four and a half to five inches. It is not difficult to understand how the head is made to extend. From its peculiar position at the lower strait, after rotation is effected, the posterior surface of the child's neck is thrown closely against the symphysis pubis, which becomes a point of resistance, so that the force of uterine effort, which until this time had fallen on the occiput, is now concentrated on the chin; the result of this change in the direction of the impelling power of the organ

is necessarily to cause the chin gradually to leave the sternum (Fig. 26) until the movement of extension is completed.

In confirmation of the fact that extension does really take place, watch carefully the first case of labor you may attend, with an occipito-anterior position of the vertex, and you will find the following to be the progress of the head as it emerges from the vulva: You will first perceive the coronal suture, then the anterior portion of the os frontis, next the eyebrows, the eyes, the nose, the mouth, and finally the chin. Such is the order of the delivery of these various parts, which is demonstration itself that the order is due altogether to the movement of extension, which the head is gradually undergoing, at this stage of the labor, during its passage into the world. Thus, the result of extension is to afford egress successively, through the antero-posterior or cocci-pubic diameter, to the perpendicular, occipito-frontal, and occipito-mental diameters of the head. It is at this period of the parturient effort that the perineum undergoes its maximum distension, so that the axis of the inferior strait is elongated forward and upward. The moment, however, the head has completely freed itself from the *os externum*, the anterior border of the perineum recedes, and comes directly in contact with the front of the child's neck. The immediate consequence of this recession of the perineum is to cause the head, which had previously been elevated toward the pubes, to fall by its own gravity downward toward the coccyx.

External Rotation.—The head is liberated—it has made its escape through the vulva, and now let us trace its further progress. When it first passes into the world—in this left occipito-acetabular position—it is, as you have seen, so situated that the occiput is in correspondence with the symphysis pubis, while the face is downward regarding the coccyx. Almost immediately, however, after its escape, it undergoes another change of position, which results in placing the occiput toward the left groin (Fig. 27), and the face in the direction of the opposite ramus of the ischium. Until the publication of the paper of M. Gerdy, this fifth movement of the head was described as the movement of restitution, and the following was the explanation given by Baudelocque, who, I think, was the first to direct attention to it—he supposed that when the head rotated in the pelvic cavity, it did so at the expense of the body of the child—in other words, the body did not participate in the movement; consequently, the head, for the time being, was twisted or in a state of torsion. The instant, however, it effected its egress, it righted itself by the institution of a parallelism between it and the body of the fœtus, which resulted in giving to the head the identical position it had previously occupied at the superior strait before undergoing the movement of rotation.

This, I repeat, was the generally received view until the appearance of M. Gerdy's paper. He has contested this explanation, and maintains that the rotary movement is not isolated—confined to the head—but participated in by the entire body of the fœtus. I must confess that, although formerly believing the old opinion to be the correct one, yet close attention to the subject in the lying-in chamber has convinced me that M. Gerdy is right. As soon as the head has undergone rotation, the shoulders, instead of occupying an oblique position, stretch across the pelvis transversely; this could not be so, if they did not rotate simultaneously with the head. Again: a very few seconds after this latter has found its way into the world, the shoulders become diagonal in the pelvis from right to left, and it is this diagonal position which accounts



FIG. 27.

for the change in the position of the head ; as the uterus contracts, the shoulders undergo another alteration of position, the right one being brought in apposition with the symphysis pubis, and the left with the hollow of the sacrum. This alteration in the direction of the shoulders necessarily imposes on the head another change in its position, so that now, in lieu of the occiput regarding the left groin, it looks directly toward the internal surface of the left thigh, and the face is turned toward the right thigh. You see, therefore, that the changes in the position of the head, after its escape from the vulva, are but the results of the changes in the position of the trunk and shoulders of the fœtus ; while, on the contrary, the rotation of the head in the pelvic cavity is the cause of the rotation of the trunk and shoulders.

Expulsion of the Shoulders and Body.—Having pursued the passage of the fœtus to this point, it will be proper to inquire in what way the shoulders and remaining portion of the child are expelled. When the shoulders have completely rotated, so that the right one is toward the pubes and the left toward the concavity of the sacrum, they continue to descend under the influence of uterine contraction ; usually, the one which is behind is disengaged first ;* sometimes, however, it will happen that the one in front is the first to be expelled, and again, I have known both to make a simultaneous egress. Still, obedient to the efforts of the uterus, the remaining portion of the fœtus makes its exit, and, as the body passes into the world, it is slightly curved upon itself, the concavity of the curve corresponding with the symphysis pubis, while the convexity regards the hollow of the sacrum. The reason of this is obvious ; the pelvis being a crooked canal, the child, in its progress through it, must, of necessity, accommodate itself to its curves.

Mechanism in the Second Vertex Position.—Right Occipito-acetabular.—In this position (Fig. 21), the occiput at the right acetabulum, and the os frontis at the opposite sacro-iliac symphysis, the mechanism is precisely the same as in the first position, with the single exception that if the rectum be distended with fœcal matter it may cause some little obstruction, during the rotary movement, to the os frontis, as it turns toward the concavity of the sacrum. In all other particulars the mechanism is identical, for the movements of flexion, descent, rotation, and extension, severally take place, and are accomplished in the same manner as in the first position. It may be well, however, to remind you that, after external rotation is accomplished, the occiput, instead of turning to the left, will, on the contrary, pass to the right.

Mechanism in the Third Vertex Position.—Right Posterior

* It may be remarked that this will depend much upon the state of the perineum ; for, if it should have been lacerated in a previous labor, the anterior shoulder will be very apt to be expelled first.

Occipito-iliac.—This position, you will recollect, according to Naëgelè, is the second in the order of frequency. The occiput is at the right sacro-iliac symphysis (Fig. 22), and the os frontis in apposition with the left acetabulum. This is the condition of things at the commencement of labor, and precisely the same phenomena occur in the progress of the delivery, as in the two preceding positions. The peculiarity, however, of this right posterior occipito-iliac position is, that, during its passage through the pelvis, the occiput is rotated first from the right posterior to the right anterior section of the pelvic canal, and is ultimately brought, as in the two positions just described, in correspondence with the symphysis pubis, while the forehead or face is directed to the hollow of the sacrum. The exceptions to this conversion of the occiput from the posterior to the anterior of the pelvis, are extremely rare—Naëgelè, as stated in the previous lecture, meeting with only seventeen instances, in twelve hundred and forty-four occipito-posterior positions, in which the conversion did not occur.

Mechanism in the Fourth Vertex Position.—Left Posterior Occipito-iliac.—(Fig. 23.) Here, again, the mechanism is the same, except that the occiput, under the influence of rotation, is brought first to the left anterior portion of the pelvis, and afterward to the pubes.

Deductions.—We have now completed the description of the mechanism by which the child, in the several positions of the vertex, is enabled, with safety to itself and parent, to pass into the world. But all that we have said on this important and interesting topic would be, comparatively at least, of little avail, if we were not to pursue the subject still more closely. I suppose it may be assumed, without much fear of error, that you now thoroughly comprehend the different stages of the mechanism of labor; and you are, no doubt, prepared to exclaim with me, how wonderful is nature, how exquisite this mechanism! The very exclamation, however, might possibly lead to wrong impressions; for, if nature, it may be urged, be really so full of wisdom, and so bountiful in her provisions, she requires no assistance from science, being thoroughly adequate to the efficient discharge of her duties. Here, then, is the point, and one, too, entitled to attentive consideration. Nature, it cannot be doubted, is, all things being equal, not only competent, but prompt in the accomplishment of her various offices; but it will sometimes happen that she is contravened in her arrangements by circumstances she cannot control, and, therefore, her relief must be found in the judicious interposition of science.

Allow me here incidentally to remark that, when you enter the lying-in chamber, your presence will involve one of two things; either you will be there as a silent spectator, an admiring witness, if you

choose, of the consummate skill displayed in the achievement of the parturient process, or it will devolve on you to give assistance, because of the intervention of some influence which has paralysed nature, and forces her to seek at your hands the needed succor. How, permit me to ask, can you render aid, with any well-founded hope of success, unless your minds be previously imbued with the mechanism by which, when not interfered with, the delivery of the child is accomplished? In one word, gentlemen, in affording this assistance, you become nature's substitute; but to be her substitute, in truth and in effect, you must have been her disciple, and learned, from her own teachings, the series of processes which, in the aggregate, make up what is known as the mechanism of labor. In this way only can you aid her, when subjected to influences which she herself cannot resist.

In order that you may appreciate what I mean, and recognise the full force of the argument, permit me, by way of practical illustration, to imagine a case of labor under the following circumstances. A lady is attacked with labor-pains at six o'clock in the morning; the medical attendant is sent for; he arrives, and, on examination, ascertains that the head presents in the first position of the vertex—the occiput at the left acetabulum, the os frontis at the right sacro-iliac symphysis; there is no deformity of the pelvis, but the head may be a shade larger than normal. The pains continue with marked regularity; it is now six in the evening; twelve hours from the commencement of the labor; but, notwithstanding the regularity and increasing character of the pains, *there is no progress whatever in the delivery*; the head is still at the superior strait, unchanged from its original position; the mouth of the womb, responsive to the contractions of the organ, is well dilated, and the “bag of waters” ruptured; the pains now become more vigorous, the scalp of the child's head is corrugated or furrowed, a demonstration that it is exposed to pressure, which, if protracted, must necessarily prove serious; there is unusual heat in the vagina, and, in addition, *the strength of the patient is giving way*. The friends become alarmed; the accoucheur is closely interrogated as to the cause of the difficulty; he assures them all is right, and offers words of encouragement to the patient, telling her that, in a short time, she will be delivered.

Time still rolls on; it is now eleven o'clock; no progress whatever; seventeen hours since the commencement of labor; the lady is more exhausted, and the head of the child still the object of intense pressure—the pains recurring with increasing force. In this condition of things, the doctor is emphatically admonished, that something must be done; in his embarrassment, he says to the husband: Sir, there is an impaction of the head, and, in order to save the life of your wife, it is absolutely necessary for me to sacrifice

the child! This language forms a striking contrast with his previous assurances, and confidence in his judgment is so far shaken, that a consultation is demanded. Let us now suppose that, in this emergency, one of you should be selected as the consulting accoucheur; you reach the house; learn the history of the case, and a vaginal examination enables you to detect, almost with the rapidity of thought, the entire cause of the delay. Nature has been vainly struggling to accomplish the movement of *flexion*; she has failed, and the consequence is that the head has been unable to descend into the pelvic cavity. After a brief consultation, you express your opinion, courteously but firmly, that there is no necessity for destroying the life of the child. The medical man in attendance differs with you; or probably will make a strong personal appeal, that there should be no difference of opinion, on the ground that he has committed himself to the family, having stated, without qualification, that the only alternative was the sacrifice of the infant! It may, indeed, be that the instruments of death—the perforator and crotchet—are already on the table, awaiting only your sanction for their reckless employment.

I need not say to you, gentlemen, that in circumstances like these, there is a paramount and sacred duty you owe the patient; all other considerations are of minor and insignificant import. Therefore, as there is but little time for argument, and death is at the very threshold, do all that you can as briefly as possible, to prove to your colleague that he is wrong; if he be a man of heart, he will readily concur in your suggestions; if without heart, and insensible to every influence, save his own selfish interest, the obligation devolves upon you to interpose, and protect from his murderous schemes both mother and child. Now, what is the suggestion you would make? Why, obviously, to aid nature in doing what she has failed in accomplishing; that is, to produce the movement of *flexion*. You may succeed, with a due degree of tact, in effecting this movement, as follows: gently grasp the head of the fetus, during the interval of pain, and with the greatest possible caution, bring the occiput downward; as this portion of the head descends, the chin will, of course, approach the sternum; this, in a word, is flexing the child's head. The whole difficulty of its descent from the superior strait is now removed, and if the pains continue active, the labor will probably soon be terminated.

In what has this simple, but most important manipulation resulted? Why, it has not only saved the child, and rescued the mother, but it has converted a house of gloom into one of joy; it has vindicated science, and made every member of that household your fast and abiding friend. Such, gentlemen, will be the precious results of true and available knowledge. Suppose, however, that after the movement of flexion has been accomplished, the strength

of the mother is so much exhausted, through previous effort, as positively to indicate the necessity of immediate delivery. In such a contingency what are you to do? Before answering this question, allow me to ask what the precise position of the head is in the pelvic cavity after the movement of flexion has been accomplished? It rests, of course, diagonally; then, if immediate delivery be necessary, the proper means of achieving it will be the application of the forceps; but remember this essential fact, in the employment of the forceps, the head being in the diagonal position—*after locking the instrument, and before making any extractive force, the first thing to be done, is gently to turn the forceps from left to right, for the purpose of producing the movement of rotation,** which will necessarily change the head from the diagonal to the direct position, by placing the occiput in apposition with the symphysis pubis, and the face in the concavity of the sacrum; this being effected, you proceed to extract the head in the manner I shall point out, when discussing the subject of forceps delivery.

* Many a child has been sacrificed, and the mother cruelly lacerated, from the neglect of this fundamental principle in delivery by forceps.

LECTURE V.

Pelvic Deformities, how divided—Evils of Increased Capacity—Case in Illustration—Dangers of Increased Capacity during Pregnancy and Labor—Diminished Capacity—Dangers of—Varieties of Pelvic Deformities—Causes of—Rachitis, Mollities Ossium—Distortion of Spinal Column does not necessarily cause Distortion of Pelvis. Obstructed Labor from Polypus—Removal of Polypus, and subsequent Delivery of Child by Forceps—Pubic Arcade—Congenital Deformity of—Craniotomy—The Space through which a Living Child can pass—Experiments of the Author—Discrepancy of Opinion among Writers—The Space through which a Child may be extracted by Embryotomy. How to ascertain that Deformities exist—In the young Girl—In the married Woman. Measurements of the Pelvis—Baudelocque's Pelvimeter—How employed—Its reliabilities—Objections answered. The best Pelvimeter, the Finger of the well educated Accoucheur—The "Toucher"—How conducted.

GENTLEMEN—I propose, in the present lecture, to direct your attention to the subject of Pelvic Deformities—a subject well worthy of your consideration, for the reason that these deformities not only exercise a very important influence on delivery, but oftentimes involve in serious peril the lives of both mother and child. A pelvis may be said to be deformed when its dimensions are either above or below the ordinary standard; hence these deformities are divided into two classes: 1st, Increased capacity; 2d, Diminished capacity. You might very naturally suppose that the larger the pelvis, the greater the facility for the transmission of the child, and, therefore, perhaps, be inclined to doubt the propriety of denominating a pelvis, with increased capacity, a deformity. It is, indeed, true that, so far as the mere passage of the child is considered, the facility of transmission is usually enhanced in proportion to the increase in the size of the pelvis. But this facility, it must not be forgotten, is too often purchased at a heavy cost, entailing upon both parent and offspring the most dangerous results. I have described to you a normal or standard pelvis, and you now appreciate the provisions nature has made for the safe delivery of the child through it. Fortunate would it be if there were no departure from the natural dimensions of the fœtus and pelvis, for then the parturient woman would be spared the anguish and danger incident to those disproportions, necessarily arising from an increase or diminution in size of one or the other.

When a pelvis is deformed in consequence of an *increased capacity*, the female encounters other troubles than those con-

nected with parturition. For example, as the direct consequence of an augmented space, she would be very likely to suffer from malpositions of the uterus, such as prolapsion, anteversion, or retro-version, and the bladder itself might become displaced. Occasionally, you will be consulted by ladies who will tell you that they are much annoyed either by a frequent desire to pass water or to evacuate the bowels; as either of these conditions may be traceable to various causes, it is of no little consequence that, in your investigation, you should arrive at a correct opinion, for the relief of the patient will necessarily depend upon the accuracy of the diagnosis.

The following case is not without interest: In November, 1855, I was consulted by a married lady from the State of North Carolina, under the following circumstances: She was twenty-one years of age, and had been married two years; no children; her first menstruation occurred just six months previous to her marriage; about two months before the appearance of the catamenia, she began to experience irritation about the bladder, giving rise to a frequent desire to micturate; and from that time until November, when I was consulted, this vesical irritation was more or less constant—being more annoying, however, a few days before her menstrual turns, and subsiding to a certain extent when these were over. This lady informed me that she had taken quantities of medicine, but without the slightest benefit. On an examination per vaginam, I ascertained the uterus to be in a state of prolapsion, but entirely free from disease of any kind; and its inclination was slightly forward, pressing upon the neck of the bladder. There was now no difficulty in accounting for the frequent desire to pass water—it was owing, as you at once perceive, to the mechanical pressure of the uterus against the bladder. In the vaginal examination, I soon discovered that the pelvis was unusually large, constituting a deformity with *increased capacity*. This, then, was an interesting example of prolapsion of the womb, not from any increase in the volume of the organ, or from relaxation of the vagina, or from the effects of concussion, but simply a case of prolapsion from an augmented capacity of the pelvis. What, under the circumstances, could be done to relieve this patient, or was she doomed to suffer without any hope of benefit? All that I did was to introduce into the vagina a soft India-rubber ball, for the purpose of giving gentle support to the uterus, and thus relieve the bladder from pressure; the result proved that nothing more was necessary.* Indeed, I do not know what else could have been

* I am very partial to the India-rubber ball. It is soft and unirritating, and has usually given me great satisfaction. Before introducing it, it is pierced with a small hole to allow the air to escape; you then fold it lengthwise, lubricate it with oil, and carry it into the vagina, being careful that the orifice looks downward toward

done, as the support of the prolapsed uterus by a pessary was the only indication to be fulfilled.

There are one or two points of more than ordinary interest about this case. In the first place, the lady did not menstruate until she was eighteen years and six months of age; and secondly, the first time she experienced irritation about the bladder was about two months before the appearance of the catamenia. The question now arises, why did she not for years previously suffer from the frequent desire to pass water? This is readily explained: the uterus, before the establishment of the menstrual function, is, physiologically speaking, dead to the economy—it is not only without office, but is comparatively insignificant in size—and hence, from this latter circumstance, there was an immunity from the vesical irritation, which only commenced when the advent of the function was at hand, and consequently the tissues of the uterus in a state of development. Again, this pressure was always more severe a few days prior to the menses, and diminished comparatively after their completion. The uterus, at that time, was more or less loaded with blood; hence its increased volume, and, as a necessary result, its increased pressure against the neck of the bladder.

During pregnancy, also, a deformed pelvis, from enlarged capacity, will involve more or less inconvenience from the various displacements to which the uterus is liable. One of the ordinary consequences of this species of deformity will be the descent of the foetal head into the pelvic cavity during the latter weeks of gestation, bringing with it the inferior segment of the uterus, which can readily be detected by the finger. From this circumstance there will arise various morbid phenomena, such as unusual bearing-down, constipation, troubles in micturition, either retention or a frequent desire to pass water, together with more or less distress in the thighs, the result of pressure on the pelvic nerves. But the greatest evils to be apprehended from an enlarged pelvis are more or less connected with the act of child-birth itself. For example, a too sudden expulsion of the foetus may result seriously in several particulars, viz. inertia of the uterus, with flooding, may occur; or, if the umbilical cord be naturally shorter than usual, or curtailed of its ordinary length by being encircled around the neck or other parts of the foetus, it may become ruptured in some portion of its extent, or torn from the umbilicus of the child, or from its attach-

the outer opening of the canal; the ball immediately becomes filled with air, and forms an admirable support to the uterus. A string should be attached to it, so that the patient may withdraw it for the purpose of having it cleansed, which should be done at least once in twenty-four hours. The patient should be taught to introduce it herself, which she can do without the least difficulty. Care must always be taken that the ball is of a proper size, neither too small nor too large; in the former case, it will fall out of the vagina; in the latter, it will be apt to irritate.

ment to the placenta; if neither of these accidents should ensue, the placenta itself may be suddenly detached from the uterus, or this latter organ become inverted, in consequence of the resistance of the after-birth to the sudden traction of the cord. In addition, there may be the hazard of rupture of the neck of the organ, from its too rapid dilatation. The occurrence of one or other of these accidents would be followed by more or less peril.

It is obvious, from what has just been said, that a patient with this class of pelvic deformity should, at the time of labor, be strictly confined to the bed, and on no account permitted to walk about the room, for the reason that the probability of any of these complications would be greatly enhanced during the act of progression. The patient should be instructed to make no effort during a pain; and the vigilance of the accoucheur will be needed, in order that early and efficient support be given to the perineum, to protect it against rupture from the sudden exit of the fœtus.

Whatever may be either the inconveniences or evils to be apprehended from a deformed pelvis with an *increased capacity*, they are immeasurably insignificant in contrast with those more formidable ones, necessarily connected with a pelvis, whose capacity is diminished. In this latter case oftentimes arise some of the most important questions connected with the practice of midwifery—questions in which the judgment of the accoucheur will be severely tested, and his feelings deeply touched. It is in instances like these in which you will be called upon to decide the issue of life or death—whether a child known to be alive in its mother's womb shall be sacrificed, or whether, with a view of equalizing the chances of survival between parent and offspring, the mother shall be subjected to an operation, which will necessarily involve her safety in the most alarming peril. These points, however, will be fully discussed under their appropriate head, when speaking of operative midwifery.

I shall not, gentlemen—for I do not think it necessary—enter upon a minute description of the various pelvic deformities enumerated by authors; I prefer to give you some general facts upon this subject, so that you may deduce from them practical lessons, which will serve you in the lying-in chamber. Your minds cannot be too well stored with facts, provided they are tangible, and made subservient to your requirements in the hour of danger. Theory and scholastic classifications may appear well enough in books; but if these books be intended to aid the practitioner in the sick room, they would, in my opinion, have more effectually accomplished the object by elaborating what is really practical, and substituting for mere hypothesis and unprofitable lore, sound and truthful principles, which will not only abide the test of the bedside, but will constitute so many lights to guide the medical man, when surrounded

*, or lost for the time in obscurity.

Varieties of Pelvic Deformity.—The pelvis may be diminished at the superior strait, at the inferior strait, or in the excavation. This diminution may exist simultaneously in these three portions of the pelvic canal, or only one portion be curtailed of its usual capacity; while the other two will present their normal dimensions. For example, the two straits and excavation may be so diminished in size, as to render it physically impossible not only for a living child to pass, but impossible, also, for the child to be extracted in fragments, when subjected to the operation of embryotomy. Again, there may be no deformity at either of the straits, but the excavation abridged by the growth of an osseous or fleshy tumor; the excavation and upper strait may be normal, while there exists at the inferior strait a diminution, which will render it impossible for a living child to be extracted, or at least protract considerably the ordinary duration of labor. Now, the very converse of this will sometimes occur—the superior strait may be so curtailed as to prolong the labor at its commencement, while the inferior presents its usual dimensions, and will afford ready exit to the child.

Let us suppose that you are attending a case of parturition with the pelvis exhibiting this latter deformity. If you be not exceedingly careful, and do not ascertain the fact of the deformity at the very advent of labor, you may possibly give an opinion as to the termination of the delivery, which will be likely to result in prejudice to your interest. You make an examination, and finding the head presenting naturally, and the uterus beginning to contract, in reply to the inquiry either of the patient or nurse, you say “All is right,” and you entertain no doubt that the labor will progress most favorably. Twenty hours may be required for nature to cause the head to pass through the abridged upper strait; finally she succeeds, and the head begins to descend into the pelvic excavation. You are closely pressed by the friends for your opinion as to the probable duration of the labor; and it may happen that you will assume as the basis of your calculation a very false principle—that is, you may argue in your own mind, if it needed twenty hours for the head to pass the superior strait, it will require at least the same time for it to escape through the inferior strait. This will prove false logic, and the result cannot but be injurious. The opinion, on the contrary, which would be given by the medical man, who had early discovered the deformity at the upper strait, would be more in unison with the result of the case. He is at once able to account for the delay in the labor at the commencement, and knowing that there was no narrowing of the pelvis at the inferior strait, he would most naturally and intelligently conclude that, save the occurrence of some unforeseen accident, the labor would be completed in comparatively a short period. The young practitioner cannot afford to prove a false prophet in the

lying-in room; his opinions are weighed not unfrequently in a capricious balance, and there are few things which will tend to injure him more effectually than error in prognosis, whether as regards the termination of disease or the duration of labor.

Causes.—The causes of pelvic deformities are various; when the capacity is increased, the deformity is almost uniformly congenital. This, however, is not always the case; I now show you a pelvis (Fig.



FIG. 28.

28), which, although originally well-formed, exhibits both in its upper and lower straits, a remarkable increase of capacity. The deformity is the result of serious injury—the female to whom it belonged was crossing the street—she fell on her side, and the wheel of an omnibus passed over

the lateral portion of the pelvis, causing a partial dislocation of the symphysis pubis, and also of the two sacro-iliac symphyses; these dislocations, as you perceive, have produced an extraordinary augmentation in the diameters of the pelvic straits.

The causes, which usually are active in the production of deformity with diminished capacity, are principally as follows: 1. *Rachitis*, a disease of infancy, the pathology of which is a deficiency of earthy matter in the bones, thus depriving them of their ability to resist superincumbent and other pressure, and consequently resulting in more or less distortion of the pelvic canal; 2. *Mollities ossium*,* or, as it is termed by the Greeks, *Malacosteon*, which is also a softening of the bone; it is a disease incident to adult age, while rachitis originates in, and is peculiar to, infancy. Both of these pathological conditions usually exhibit their results first, in the spinal column, causing various distortions of the vertebræ;† and

* *Mollities ossium* rarely occurs in women who have not borne children; and there is an interesting circumstance of practical value connected with this fact—for example, a female may have brought forth several children without difficulty; but, in a future pregnancy, a deformity, the effect of *mollities ossium*, may occur, which will render embryotomy or the cæsarean section necessary. It would seem, therefore, that child-birth exercises more or less influence on this terrible malady, a leading characteristic of which is a *shortening of the stature of the individual*, owing to the giving way of the spinal column.

† It is important to recollect that distortion of the spinal column does not necessarily involve a deformity of the pelvis. Without a knowledge of this fact, the practitioner would sometimes be liable to error in forming his opinion as to the existence or non-existence of pelvic deformities. It has, I am aware, been asserted

you can readily understand why, in these affections, the superior strait of the pelvis should so frequently become the seat of deformity. The base of the sacrum receives the last lumbar vertebra, and, in this way, necessarily sustains the weight of the trunk; under these circumstances, when there is a softening of the bones, nothing would be more likely than a projection toward the symphysis pubis of the sacro-vertebral prominence, and necessarily an abridgment of the dimensions of the upper strait. In fact, either in *Rachitis* or *Mollities ossium*, as a general rule, the deformity of the pelvis will be in precise relation with the particular kind of pressure exercised on its different bones. If, for example, from disease or other circumstances, the individual keep her bed, and continue for a long time in a recumbent posture—if on her back, the deformity would be from before backward, because of the projection forward of the sacrum; if on her side, the deformity would be in the transverse diameter, because of the lateral pressure, thus causing more or less approximation of the sides of the canal.

In addition to the causes already mentioned, there are others worthy of note, which will occasionally result in deformity of the pelvis—such as morbid growths, either osseous or sarcomatous, in the excavation,* fractures of the pelvic bones, ulceration of one or

by some writers that there is a necessary and constant relation between distortion of the spine, and distortion of the pelvic canal. This, however, is not in accordance with facts.

* Sometimes these morbid growths, such as polypoid and fibrous tumors, will curtail by their presence the dimensions of the pelvis, although there is actually no deformity in the bones of the pelvis itself—these growths being attached to the uterus, and sometimes, too, finding their seat in the vagina. Under these circumstances, it becomes a very nice question, especially at the time of labor, to decide on the course to be pursued. The following case is in point:

In September, 1853, I was requested to visit a patient twenty miles distant from the city, in consultation with Dr. James Ridley. She had been in labor with her first child thirteen hours before I saw her. Previous to, and during her pregnancy, she had been subject to severe floodings; the patient was in an anæmic state, and evidently suffering from strong labor pains. My friend, the Doctor, stated to me that he had made several attempts to reach the mouth of the womb, but failed in consequence of a tumor in the vagina. During the throes of labor, the tumor was pressed toward the vulva, accompanied by considerable hæmorrhage. What was this tumor? At the Doctor's request, I made a vaginal examination, and, after some difficulty, succeeded in directing my index finger along the posterior wall of the vagina, as far as the os uteri; here, I very distinctly felt a stalk or pedicle attached to the posterior lip of the cervix. In bringing the finger toward the external orifice of the vulva, I could recognise a firm, uniform substance, increasing in volume as it extended toward the orifice; it was insensible on pressure. The examination developed, therefore, some interesting facts—viz., that the tumor was pedunculated, the pedicle being upward, and the base downward, together with insensibility on pressure; these are the very essentials of a polypus of the womb—and the other important feature of this character of growth was present, viz. hæmorrhage; and in addition, as I have already stated, the patient suffered from bleeding both before and during her pregnancy. Dr. Ridley concurred with me in opinion, as to

other of the acetabula, permitting the head of the os femoris to pass into the pelvic cavity; syphilitic disease and mercurial cachexy will also, in some instances, contribute to a modification and deformity of the pelvis.

It sometimes happens that a pelvis will present a general and corresponding diminution in all its dimensions, the result of original conformation; and, in such case, the woman will frequently exhibit no indication whatever of disease—but, on the contrary, in every particular she bears the evidences of excellent health. Here, then, is an example of primitive or original malformation—consisting simply in a uniform curtailment of the respective diameters of the pelvis, not traceable to any special cause—but which may give rise to very serious obstruction during the passage of the child. This species of deformity, however, is comparatively rare.

The pubic arcade of the female pelvis will occasionally constitute the only deformity; in such case, it bears a striking analogy to the arcade of the pelvis in the male—the rami of the ischium and pubes, on either side, instead of forming the usual angle, descend perpendicularly, thus curtailing the outlet in such way as to render it physically impossible that a living child can pass, and, therefore, calling for the operation of embryotomy or the cæsarean section as the case may be. This species of deformity is, I think, extremely rare. On one occasion I met with it; in all other respects, the pelvis was well formed: Dr. Nugent, of Long Island, requested me, in May, 1851, to see a lady under the following circumstances; she was in labor with her first child; the pains had been regular and active, and everything progressed favorably until the head reached the

the nature of the tumor, and the next important question was—what, under the circumstances, could be done? The labor pains were well marked and regular—the patient was weak from previous and present losses of blood—the tumor so nearly filled up the vagina, as to establish beyond peradventure the utter impossibility of delivery without its removal. Without hesitation, therefore, I proposed this as the only alternative—with the concurrence of my friend, and, at his request, I excised the tumor in the following manner: Directing my finger upward as a guide as far as the posterior lip of the os uteri to which the pedicle was attached, I then introduced flatwise along my finger a probe-pointed bistoury, with which I separated the pedicle from its attachment—the finger and instrument were then withdrawn, and the next point was to remove the polypus from the vagina. This was accomplished by means of hooks placed on either side of the tumor, which, after some considerable traction, was brought into the world. The polypus was quite firm, and weighed six ounces. The pains of labor increased with the extraction of the polypus, and the patient, although much prostrated, bore her sufferings with remarkable heroism. It became, however, quite evident, after the lapse of six hours from the removal of the tumor, that the strength of the patient was fast giving way—the head had descended to the inferior strait, and the exhaustion of the lady becoming more and more marked, it was judged proper to have recourse to the forceps. At the request of Dr. Ridley, I applied the instrument, and extracted a fine living son. The mother and child are at this time both living, and in the enjoyment of good health.

inferior strait; at this stage of the labor, although the pains were strongly expulsive, there had been no progress for a period of eight hours; the patient was becoming exhausted, and the head of the child encountered extreme pressure. It was under these circumstances that I saw her; on an examination, I found the pubic arcade, in its widest portion, measuring only two inches and an eighth. This contraction of the arcade at once accounted for the delay in the delivery, and there was no alternative but the operation of embryotomy. It was quite manifest that no force which the uterus could exercise would be adequate to accomplish the exit of the child through such a contraction; nor was there the remotest hope of consummating the delivery by means of the forceps. In such a contingency, delay would have sacrificed the mother; and much as I am opposed to this operation on general principles, yet, in the present instance, with the entire concurrence of Dr. Nugent, and at his request, having strong proof of the death of the child, I proceeded to remove it. The operation was accomplished without much delay, and the patient had quite an auspicious recovery. The deformity in this case was unquestionably congenital, constituting one of those anomalies in organization, which are occasionally met with, but which cannot be explained on any rational principle. It was evidently in no way connected with disease of the osseous structure. The health of the lady had always been excellent.

Oblique Distortion of the Pelvis—obliquè ovata.—Prof. Naëgelè was the first to direct attention to a peculiar deformity of the pelvis, which he denominated *pelvis obliquè ovata* (Fig. 29). His monograph on the subject has been translated into French by M. A. C. Danyau, and discloses a vast deal of research. Naëgelè collected thirty-seven examples of this species of distortion, only two of which were in the male sex. The deformity consists in an abridgment or flattening of one of the lateral portions of the pelvis; in the



FIG. 29.

thirty-seven cases alluded to, the distortion was observed twenty-two times on the right, and fifteen times on the left side. On the affected side, there is complete anchylosis or fusion with the sacrum and innominatum; on *post-mortem* inspection, not the slightest trace

of the synchondrose articulation can be discerned. The Professor supposes the fusion of the articulation to be congenital; others, among whom may be mentioned Dr. Rigby, attribute it to previous inflammation of the part. This deformity is of extreme danger at the time of labor, for, as far as the results have been obtained, Nægelè says they have been fatal to both mother and child in every instance but one.

What is the smallest space through which a living child may be extracted—and embryotomy practicable?—Let us now examine the most important question connected with the subject of pelvic deformities; for, after all, the great point for us as obstetricians is—what is the actual amount of curtailment, which will prevent the passage of the living fœtus, and, therefore, call for an operation which necessarily sacrifices the child, or places in imminent peril the safety of the mother? There is much discrepancy of opinion among authors, as to the space required for the transmission of a living fœtus; and the same discrepancy, too, exists as to the extent of contraction through which it is possible to extract a child, fragment by fragment, in the operation of embryotomy. It seems to me that these two questions are not matters of opinion—they are, on the contrary, questions of fact. Hypothesis here is of no possible avail, unless confirmed by positive and ample experiment. In order to settle the argument for myself, not by theory, but through actual demonstration, I caused, several years since, six wooden pelves to be constructed with the following dimensions—1st. The antero-posterior diameter of the superior strait measures three inches.

2d. The antero-posterior diameter measures two inches and three-quarters.

3d. The antero-posterior diameter measures two inches and one-eighth.

4th. The antero-posterior diameter measures two inches.

5th. The antero-posterior diameter measures one inch and three-quarters.

6th. The antero-posterior diameter measures one inch and a half.

With the pelves Nos. 1 and 2, I have experimented with a view of ascertaining whether it was possible to extract a fœtal head, possessing the ordinary dimensions at full term, without subjecting it to such pressure and injury as necessarily to destroy life; and, after repeated and careful trials, I arrived at the conclusion that the smallest possible space, except in extremely rare instances, through which a living fœtus, at the end of gestation, can pass, is a diameter of three inches and an eighth antero-posteriorly—and even with such capacity, there will necessarily be much delay in the delivery, and, to a certain extent, more or less danger to the child.

With the pelves Nos. 4, 5, and 6, I have repeatedly made the attempt, but unsuccessfully, to bring away the fœtus piecemeal, and am satisfied that this cannot be accomplished—without the almost certain hazard to the mother of lacerations, which will more or less involve her life, or at least, entail upon her sufferings, to which death itself would oftentimes be preferable—with a contraction in the antero-posterior diameter of less than two inches and an eighth. These results,* gentlemen, may strike you as singular, especially as they are at variance with the opinions of men of high authority, who have been regarded as almost oracular upon these important questions.† But I am quite sure that I am right. This subject will be again referred to, when speaking of the operations to be performed on the mother and child, in consequence of pelvic deformities.

Measurement of the Pelvis.—You may be called upon to determine the measurements of the pelvis under either of the following circumstances: 1. In a young girl, who may be suspected, by her mother, to have a deformity, which, in the event of marriage and pregnancy, might peril her life; and, therefore, your opinion will be required to decide this important question. You at once perceive how sacred the responsibility of such a position, and what delicate issues will necessarily be involved in your judgment of the case. 2. A woman with a deformed pelvis may be in labor, and it will rest with you to determine what course is to be pursued—whether the deformity is such as to prevent the passage of a living child—whether the labor can be terminated by the forceps—or whether the alternatives of the cæsarean section, embryotomy, or version, be indicated.

These, gentlemen, are among the grave and trying points of our profession; and their just solution requires sound judgment, ripe experience, and inflexible integrity. We will now suppose the case of the young girl. How are you to proceed in the examination to ascertain the condition of the pelvis? Under these circumstances, an internal examination cannot be justified, nor is it at all necessary. You, therefore, conduct your investigation in the following man-

* It may, perhaps, be urged that the deductions arrived at are not reliable, for the reason of the difference in the yielding of the natural and artificial pelvis; but with the full recognition of this difference, and a proper allowance for it, I have faith in the results.

† Busch, of Berlin, says, for a living child to pass, the antero-posterior diameter must measure from two and a half to three inches; Scanzoni, two inches and three-quarters; Burns, three and a quarter; and Dr. Joseph Clarke, three and a half inches.

As regards the space through which it is possible to perform the operation of embryotomy, Burns says one and three quarters are required; Hamilton, one and a half inches; Osborn one and a quarter; Davis, one inch; Dr. Dewees would not advise the operation under two inches.

ner:—In the first place, you will inform yourself of her early history—whether in infancy she was healthy; whether, during that or any subsequent period, there was any indication of rickets, scrofula, &c; examine into her present condition; is her appetite good—how is her digestion—is she strong and muscular—how is her sleep? Has the catamenial function appeared—if so, is it regular? Does she walk firmly, or is there evidence of lameness? These questions, if properly answered, will aid you materially in arriving at a correct opinion. But, in addition, you can make an external examination of the pelvis as follows: It is better, I think, to have the girl in the standing position, with her back supported against the door or wall—then with your hand introduced, the chemise intervening between it and the pelvis, scrupulously avoiding all exposure of her person, you ascertain whether the symphysis pubis has its proper shape, whether too prominent or too flat; are the crests of the ilia natural, or do they approximate too closely? How are the anterior-superior spinous processes—are they too nearly approximated, or do they maintain their natural position? Then place your hand on the sacrum, and ascertain whether it is too projecting, or whether it recedes unnaturally. These are the special points to which your atten-



FIG. 30.

tion is to be directed in this kind of exploration. You then have recourse to the pelvimeter, for the external measurement of the pelvis.

Pelvimeter—how used.—The best instrument, and most reliable one for this purpose, is the pelvimeter or callipers (Fig. 30) of Baudelocque. It consists of a scale and two extremities. In order to recognise the antero-posterior diameter of the superior strait, one extremity of the instrument is placed at the symphysis pubis, whilst the other is brought in contact with the superior spinous process of the sacrum. If the antero-posterior diameter be natural, the scale of the instrument should give you seven inches, and then you deduct two and a half inches for the thickness of the sacrum, and half an inch for the symphysis pubis, which will leave four inches, the measurement of the direct diameter at the superior strait. For the measurement of the oblique diameter, one extremity of the instrument is placed upon the great trochanter, the other upon the opposite sacro-iliac symphysis—the scale should, in this case, yield nine inches; deduct two and three quarter inches for the thickness of the trochanter, neck, and head of the femur, and one and three quarters for the thickness of the sacro-iliac symphysis—this will make four and a half inches to be taken from nine inches, which will leave four and a half, the measurement of the oblique diameter at the upper strait.

The pelvimeter of Baudelocque, I repeat, is an accurate and reliable instrument; but I can readily anticipate your objections to it. You will ask me, for example, how this external measurement will suffice to prove that there is no abridgment of the dimensions of the pelvis internally by the presence of tumors, or other formations? The question is a legitimate one, and I will endeavor to answer it. If there be a curtailment of the pelvic capacity in consequence of the presence of tumors, whether osseous, fibrous, or of any other character, these tumors would unquestionably give some indication of their presence by certain pathological phenomena, such as irritation, more or less, of the bladder or rectum, pain in the back, numbness of the lower extremities, a sensation of dragging, and pressure downward. Therefore, in the absence of these or other symptoms, I should be disposed to have faith in the developments of the instrument. In order to become satisfied as to the configuration of the inferior strait, the pulp of the thumb is placed under the symphysis pubis, and the end of the index finger on the tip of the coccyx; with the thumb and finger thus separated, the space between them is measured by a scale, and the result will show whether the cocci-pubic diameter be normal or otherwise. In the same way, the measurement of the bis-ischiatric diameter can be ascertained, by placing the thumb on the tuberosity of one ischium and the index finger on the opposite tuberosity.

Internal Measurement.—Numerous contrivances have been suggested for the internal mensuration of the pelvis; but, with all due respect for their inventors, I must, in candor, caution you against

their employment. They cannot be resorted to without subjecting the female to more or less pain ; and, moreover, they are wanting in precision in their results. In the married woman, all instruments may be dispensed with, for here we can employ what I consider the very best pelvimeter, because it is the most searching in its explorations, and the most positive in its results—I mean *the finger of the well educated accoucheur*. This brings me to a few general observations on the important subject of vaginal examination by the finger, or as it is termed by the French—the *toucher*. The patient should be placed either on her side or back—where there is no special objection, the back I think preferable—the accoucheur then places his thumb directly in the palm of his hand, and covers it closely with the middle, ring, and small fingers, so that the index finger may be free—this latter is the only one required for the vaginal examination ; and the directions just given, if recollected, will frequently spare the practitioner much embarrassment, and his patient no little annoyance.

I have known instances in which the vaginal examination has been attempted without regard to any rule or principle—the hand, with the fingers separated, carried toward the vagina, one finger, perhaps, finding its way into the meatus urinarius, another pressing upon the clitoris, while a third would probably be on the outer boundary, if, indeed, it did not penetrate the anus itself, constituting in all truth a *fundamental* operation, and causing the patient to re-

buke, in severe language, the operator for his stupidity and ignorance ! The index finger being lubricated with oil, or some mucilaginous material, is introduced gently into the vagina, at first from *before backward* and then from *below upward*. A general sweep of the vagina is to be made during this examination, to ascertain the condition of the excavation, whether its capacity is natural or whether abridged by some foreign growth ; the radial border of the finger is then placed under the



FIG. 31.

symphysis pubis, and the apex directed toward the promontory of

the sacrum (Fig. 31). With the index finger of the other hand, placed on the radial surface of the finger in the vagina just outside of the symphysis pubis, the finger is withdrawn from the vagina, and a scale applied for the purpose of measuring it; this will probably, in case of a natural conformation, give four and a half inches—but half an inch is to be deducted for the obliquity of the finger in its course from the symphysis pubis to the sacro-vertebral prominence, which would leave four inches the normal antero-posterior diameter at the superior strait. This mode of measurement has been objected to by certain writers on the ground, that, in some cases, the index finger could not reach the sacro-vertebral prominence. Well, it seems to me that, admitting the objection to be valid, it demonstrates the very thing we desire, viz. that there is no contraction in the antero-posterior or direct diameter. The measurements of the inferior strait are to be conducted as we have already described in the case of the young girl. Some authors, and Velpeau among others, recommend for the internal examination the introduction into the vagina simultaneously of the index and middle fingers, so that while the latter is extended toward the sacral prominence, the former may rest on the internal surface of the pubes. But I cannot see the necessity of this suggestion; while, on the contrary, there is, in my judgment, a positive objection to it—*an increased irritation of the vagina.*

LECTURE VI.

Organs of Generation—External Organs—The Mons Veneris, Labia Externa, Clitoris, Labia Interna, Vestibulum, Meatus Urinarius, and Urethra—Secretory Apparatus of the External Organs—Sebaceous and Muciparous Follicles—Vulvo-vaginal Gland—The Internal Organs—The Vagina, its Anterior and Posterior Relations.—The Urethro-vaginal, Vesico-vaginal, and Recto-vaginal Septa—Vesico-vaginal and Recto-vaginal Fistula—How produced—Orifice and Superior Extremity of Vagina—The Hymen, its Absence no Test of Loss of Virginity—Its Presence no Evidence that Sexual Congress has not occurred—Retention of Menses mistaken for Pregnancy—Blood-vessels and Nerves of Vagina—Uterus, Uses and Situation of—How divided—The Structure of Uterus composite—External and Internal Coat—Intermediate Tissue is Muscular—Is the Uterus an Erectile Organ?—Rouget's Researches—Blood-vessels, Nerves, and Lymphatics of Uterus—Recto-uterine Fossa, Importance of—Ligaments of Uterus—The Cervix, its Peculiarities before and after Puberty—Os Tincæ, Cicatrices upon, not always reliable as evidences of Childbirth—The Fallopian Tubes—The Ovaries, the Essential Organs of Generation—Structure and Uses of the Ovaries.

GENTLEMEN—The organs of generation in the female are usually divided by authors into external and internal, embracing, under the former head, those which are situated on the outside of the pelvis, while the latter are contained within the pelvic canal. This division is not strictly correct, for we shall see, as we proceed, that the organs external to the pelvis are not in reality those of generation; they are simply auxiliary to that act, and may, therefore, with much more propriety, be denominated the copulative organs.

I need scarcely assure you that an accurate knowledge of these parts, both as regards their anatomical structure and relations, together with the numerous pathological changes to which they are exposed, is absolutely essential to the obstetrician. Without this knowledge, you will, in the practice of midwifery, be constantly liable to error, nor can you hope to diagnose or successfully treat the varied and important maladies occurring in these organs. I ask your attention, therefore, especially to this subject, and shall endeavor to be as brief as is consistent with clearness in description.

External Organs.—They are as follows: 1. The mons veneris; 2. The labia externa; 3. The clitoris; 4. The labia interna; 5. The vestibulum; 6. The meatus urinarius and urethra. Most anatomists comprehend these different parts under the name of *vulva*, which is also given by some others to the opening extending from

the mons veneris to the anus. The term *pudendum* is likewise occasionally employed to designate the external genitalia in the female.

1. The *mons veneris* is situated in front of the symphysis pubis, and, at the period of puberty, is covered with hair. It is a sort of cushion, sometimes remarkable for its prominence, which is usually the case in fat women. Occasionally, too, this prominence is due to a projection forward of the pubic bones; again, it presents a flattened aspect, which is observed more commonly in emaciated persons, owing to the absence or absorption of the adipose tissue; and you will also find it receding inward, depending upon a recession of the bones of the pubes. In structure, the mons veneris consists of fatty or adipose matter, a fibro-filamentous substance, and cellular tissue. It sometimes becomes the seat of active inflammation, which may terminate in abscess. Under these circumstances, it is important to give early and free escape to the purulent secretion; otherwise, much annoyance may ensue to the patient from the formation of fistulous or burrowing openings, which will not only result in much unnecessary suffering, but oftentimes occasion a tedious convalescence.

2. The *labia externa* or *majora* are two duplications, commencing at the central and inferior portion of the *mons veneris*, at what is termed the superior commissure, and extending nearly parallel to each other downward to their terminal point, known as the inferior commissure. These labia have an external or cutaneous covering, and an internal or mucous investment, which is a continuation of that of the vagina, and is characterized by great delicacy and sensibility; they are composed of an intermediate structure, consisting of adipose and filamentous cellular tissue like that of the dartos of the scrotum; the round ligaments of the uterus expand themselves in the labia externa. Just above the inferior commissure, the labia are united by a small fold of integument, which has received the name of fourchette, and the little space comprised between the fourchette and posterior border of the vaginal orifice is called the fossa navicularis. The fourchette is almost always ruptured in the first labor, and neither it nor the fossa is of any special importance. The labia externa enjoy a remarkable elasticity, which enables them at the time of childbirth to undergo, without laceration or injury, the necessary degree of distension. On their internal surface are mucous and sebaceous glands, which, in health, secrete a lubricating fluid, the object of which is to soften the parts, and protect them against the consequences of friction. Occasionally, however, during pregnancy, and also in the unimpregnated state, these glands, through some morbid influence, pour out an extremely acrid and irritating material, which inflames and excoriates the labia; if the female be married, this acrid secre-

tion may produce in her husband a gonorrhœa, so that a full measure of vigilance will be required, on the part of the practitioner, not to confound it with a true syphilitic affection.

Do you not, at a glance, appreciate the inevitable and melancholy consequences of error of judgment in a case like this? Let us suppose an instance; and it is not so hypothetical that it may not present itself to any one of you, when you shall have become engaged in practice. You are, we will imagine, the family physician—every confidence is reposed in your skill as a practitioner, and in your honor as a man. The father of that family comes to you, and says he wishes a strictly confidential interview; he tells you he is in a state of much disquietude, and, for the last four days, has not dared to give latitude to thought, for the very suspicion which has crossed his mind is worse to him than death. He says he has suffered for a week past from an intense scalding in micturition, and there is a discharge of matter from the penis. "Allow me, my friend," you observe to him, "to examine the parts;" he consents, you see the inflamed condition of the penis, and, in a jocose manner, you exclaim, "Oh! that's nothing; you have been on a frolic—the next time, my friend, you must be more careful—you have the clap, sir!" It may be that such an opinion will be in accordance with facts, and no particular harm, therefore, will grow out of this display of facetious mirth; you cure your patient of his disease, and receive the equivalent, your fee, and there the matter terminates. But let us look at the other side of the question. This husband listens calmly to your opinion, and, perhaps, asks you if there be not a possibility that you may be in error as to the cause of his disease. "Oh! no, sir," you reply, "there is no more doubt about it than that two and three make five." "Then, doctor, my happiness is at an end! If you are right I have taken that disease from my wife!" Now, gentlemen, this inflammation of the urethra, and the scalding during micturition, may have been derived from sexual intercourse with his wife, without the slightest violation of conjugal fidelity. After the opinion so hastily given, it will be too late to recall it; that opinion has plunged a dagger into the heart of your patient; and though it may possibly be withdrawn, yet the wound is there, and it will continue to fester, and prey both upon his moral and physical health.

The *labia externa*, in the young girl and in the unmarried female, are firm, and usually closely approximated on their internal surface—but, as a consequence of matrimony and childbirth, they become relaxed, and are more or less separated. They are, occasionally, the seat of various pathological conditions,* such as serous infiltra-

* For the full description of these conditions, their causes, treatment, etc., I may refer the reader to my work on the *Diseases of Women and Children*.

tions, sanguineous and purulent engorgements, hernial protrusions, lipomatous* or fatty growths, chancre, and varicose veins—these latter more commonly occurring during pregnancy, in consequence of the obstruction offered by the gravid uterus to the venous circulation.

3. The *clitoris*, a small erectile body, is situated between the labia externa below the symphysis pubis, its lower or free extremity terminating immediately under the superior commissure, and known as the *glans clitoridis*; there is a small fold of mucous membrane covering it, called the *preputium clitoridis*. This body is the analogue of the penis in the male, and is supposed to be the seat of the venereal orgasm. It possesses an erectile tissue communicating with that of the bulb of the vagina, which is on either side, in correspondence with the ascending branches of the ischium; these bulbs become united at the origin of the clitoris. This latter body sometimes becomes morbidly enlarged, so that it may be necessary for the comfort of the patient to excise it, which can be done without difficulty; the operation involves no danger. When preternaturally enlarged, it has occasionally given rise to the supposition that hermaphroditism exists.†

4. The *labia interna* or *minora* are situated just within the *labia externa*, and extend from nearly the superior commissure to the centre of the vagina; they are two membranous folds, and in shape have been likened to the comb of a cock; they are composed externally of mucous membrane, a continuation of that of the vagina, and internally of cellular tissue; they possess great sensibility. They are called *nymphae*, for the reason that they were supposed by the early writers to direct the course of the urine. These labia sometimes become morbidly developed, and, in such

* On the 16th day of February, 1857, Dr. J. G. Hialop brought to my clinic an interesting case of tumor growing from the inferior portion of the outer surface of the right *labium externum*. The tumor was pediculated to the *labium*, and made its first appearance nine years previously; it measured five inches and a half in length, and its broadest diameter was three inches. The patient was a poor German woman, who was compelled to support her family by her daily toil, and the presence of this tumor was a constant source of annoyance, interfering with progression, and becoming ulcerated from the friction against the thighs. On examination, I found the growth to be a lipoma, or fatty tumor, and with the concurrence of Dr. Hialop, and at the earnest request of the patient, I removed it before my class. The operation was quite simple; the pedicle, which was about an inch in breadth, was detached by the knife, and the lips brought together by two sutures. The patient, in a few days, was well, and able to attend to her business with comfort. In one year from the day of the operation, she was the mother of a healthy little daughter.

† The opinion has prevailed that the clitoris becomes much more increased in volume in prostitutes than in married women, whose sexual intercourse is legitimate. Jacquemin and Collineau positively assert, after a full examination of the subject, that the prostitutes of Paris reveal nothing remarkable, either in the form or dimensions of the clitoris. [De la Prostitution dans la ville de Paris, par A. J. B. Parent-Duchatelet, vol. i, p. 211.]

case, may be removed. It has been very absurdly supposed by some authors, that the nymphæ, during labor, increase the capacity of the vulva by their total disappearance; but this is simply an hypothesis without a shadow of truth, which can be readily verified in the first case of labor you may attend. They most likely augment the surface of secretion. In women who have borne many children the nymphæ become relaxed, and attain an increase of volume, so that they project considerably beyond the labia externa. On one occasion, I was requested to meet a medical friend in consultation, in consequence of what he supposed to be a breech presentation. On examination, I found that not only there was no breech presentation, but the os uteri had just begun to dilate, and the head of the fœtus was distinctly felt at the superior strait. The error of my friend consisted in the fact that, in attempting to introduce his finger into the vagina, he felt the relaxed and projecting nymphæ, which he supposed to be the testes of the infant. It will be well for you to bear this mistake in memory. It may serve you at some future time.

5. The *vestibulum* is a small, triangular space, with its apex upward and its base downward; it is bounded above by the clitoris, on either side by the nymphæ, and below by the *meatus urinarius*, which you know is the outer opening of the urethra. The vestibulum occasionally becomes studded with small fleshy excrescences, which give rise to profuse mucous discharge; in such case the only remedy for the discharge will be the removal of the excrescences. It also furnishes an important guide for the introduction of the catheter, as I shall more particularly state at the proper time. It is well to mention, that some authors describe the vestibulum as extending from the mons veneris to the hymen.

6. *The meatus urinarius and urethra.*—The female urethra terminates externally by an orifice called the *meatus urinarius*, which is a small, rounded opening; it is found immediately below the vestibulum. The urethra itself is about an inch and a quarter in length, slightly oblique from without inward, conical in shape, and extremely dilatable; it has neither a prostatic nor bulbous portion; in consequence of its shortness and great dilatability, urinary calculus is comparatively rare in the female, for the reason that the nucleus of the formation is, as it were, washed out of the bladder at the time of micturition. The structure of the urethra consists of cellular tissue, together with muscular fibres; it is lined internally with a mucous covering in continuation with that of the bladder. The inferior wall or belly of the urethra is united to the anterior wall of the vagina, and would necessarily be exposed to more or less contusion, at the time of labor, if it were not that it is furnished protection by the summit of the pubic arcade, in which it becomes lodged during the passage of the fœtus through the vulva.

Instances are recorded, and which seem to have been accepted, in which sexual congress took place through the urethra. In one patient, on whom I performed the operation of vaginal-hysterotomy with safety to both mother and child, the urethra was so much dilated that I could introduce the index finger as far as the neck of the bladder without producing the slightest uneasiness.*

Glandular apparatus of the external genitalia.—This finishes the description of the external organs, which, however, would be incomplete without a reference to the very important contribution made by M. Huguier† touching the existence, distribution, and pathological condition of the secretory apparatus of the external genitalia. The glandular or secretory apparatus of these parts is divided into the sebaceous and muciparous glands; the latter present two separate varieties. Those of the first variety are distinct, and are found about the clitoris, vestibulum, and in different portions of the external opening of the vagina. Those of the second variety, on the contrary, are united, covered by one envelope, and have, in common, but one excretory duct, thus constituting a veritable gland, to which M. Huguier has given the name of *vulvo-vaginal gland*. This gland was known to, and briefly described by some of the anatomists of the seventeenth century, but it seems to have been the good fortune of Huguier to have directed special attention to it within our own times. The period of its greatest development is between the ages of sixteen and thirty-eight years, its volume depending upon the age and habits of the individual. The *vulvo-vaginal gland*, one on either side, is situated on the borders of the vulva and vagina, on the posterior and lateral surfaces of the latter, just above the superior edge of the hymen, in the triangular space formed, on each side, by the separation of the inferior fifth of the vagina and rectum. These muciparous organs, both in their distinct character as well as in their united condition, under the term *vulvo-vaginal gland*, are subject to various morbid conditions, to which too much attention cannot be given by the practitioner, and which I am sure are often mistaken for affections of the uterus and adjacent viscera. It would be out of place for me to refer, in the present work, more in detail to these pathological changes, but they are, in every way, worthy of your attention.

Internal Genital Organs.—These organs are: 1. The vagina; 2. The uterus with its appendages, composed of the broad and round ligaments, fallopian tubes, and ovaries.

1. The *vagina*, the vulvo-uterine canal, as it is sometimes termed, measures from five to six inches in length; it is curved, correspond-

* See my work on the Diseases of Women and Children, p. 255.

† Mémoires de l'Académie de Médecine, vol. xv., p. 527.

ing with the curves of the pelvis, so that its upper or uterine extremity is in relation with the axis of the superior strait, while the lower or vulvar extremity corresponds with the axis of the outlet—consequently, the concavity of the curve is in front, the convexity behind.

The *anterior* relations of the vagina are with the urethra and bladder; through the medium of cellular tissue, it is in union with the urethra, constituting the *urethro-vaginal* wall or septum, and by the same mode of connexion it is united to the bladder, forming the *vesico-vaginal* septum. These relations, it is important for you to bear in mind, for they will enable you to understand why, in certain protracted labors where undue pressure has been made by the fœtus against one or other of these septa, inflammation, in the first place, and then ulceration may ensue, giving rise to either a urethro-vaginal or a vesico-vaginal fistula, the diagnosis of which is furnished by the fact that urine, instead of passing through the excretory duct of the bladder, is more or less constantly dribbling into the vagina, through one or other of these openings. It happens, too, that these fistulæ are sometimes the result of instrumental delivery, whether by the forceps or crotchet, but in such cases they are almost always the product of carelessness or ignorance.

The *posterior* relations of the vagina are also worthy of attention. In order that you may have an accurate idea of these relations, let us divide the posterior surface into five fifths; the superior fifth is floating, and encircles in part the posterior portion of the os uteri; the three middle fifths are in contact with the rectum, constituting the recto-vaginal septum, and the inferior fifth is separated from the rectum by the interposition of the perineum. The recto-vaginal septum may also become the seat of injury, giving rise to a recto-vaginal fistula, through which the fecal matter will pass directly into the vagina, entailing upon the patient the most loathsome, and oftentimes rebellious malady. It, like the urethro-vaginal and vesico-vaginal fistulæ, is too frequently the result of ignorance or neglect in the management of the delivery.

In addition to these relations of the vagina, it is divided into its *orifice* or outer opening, and its *superior extremity*. The former, the *orifice*, is below and posterior to the labia interna; and, in the virgin, is nearly closed by a delicate membrane called the *hymen*, which is usually pierced by a small opening for the escape of the menstrual blood.

It was formerly supposed that the presence of the *hymen* was an undoubted proof of virginity, and, also, its absence a full demonstration that sexual intercourse had taken place. Both of these hypotheses are founded in error, and are calculated to lead, in some instances, to unjust decisions. In the first place, well authenticated cases, about which there can be no doubt, prove incontestably that,

not only is it possible for sexual intercourse to take place without a rupture of the hymen, but that such intercourse may be followed by impregnation;* and the proof is furnished by instances in which the accoucheur, at the time of labor, has been obliged to incise the hymen for the purpose of allowing the child to pass through the vagina. These, of course, constitute exceptional cases of extremely rare occurrence, but still they are of value in reference to the point under consideration.

Again: there are numerous causes, other than sexual congress, capable of destroying the hymen, such, for example, as falls, blows, a sudden and profuse discharge of menstrual blood, disease, etc. I might here remind you that, occasionally, this membrane does not present any opening—it is completely closed, and, under such circumstances, the catamenial fluid has no outlet; it accumulates from month to month within the uterus and vagina, causing enlargement, thus giving rise to the suspicion of pregnancy. These are cases, which require all the vigilance of the accoucheur to enable him to rescue innocence, and shield character against erroneous judgment. We shall again refer to this subject when discussing the evidences of pregnancy.

The *superior extremity* of the vagina is in contact with the neck of the uterus, which it completely encircles; it passes a little higher on the posterior than on the anterior surface, which has led to the belief that the posterior lip of the os uteri is longer than the anterior, which, however, is not the case.

The *internal surface* of the vagina is lined by a mucous membrane, which presents on its anterior and posterior portions, extending from before backward, a median crest or column, from which appear to arise numerous transverse folds of mucous investment. These mucous folds or rugæ are more distinct in virgins, and are most numerous at the inferior portion of the canal; in women, who indulge much in intercourse, they are less distinct, while they entirely disappear after the birth of several children. Dr. Franz Kilian has shown, with the aid of the microscope, that the mucous lining of the vagina is abundantly supplied with vascular papillæ, and it also possesses a distinct tessellated epithelial covering, without glands or follicular openings.

The vagina cannot be considered an erectile organ. The *lateral boundaries* of this canal afford attachment, above, to the broad

* It may appear, at first view, inconsistent to assert that pregnancy can be accomplished without rupture of the hymen. But in this connexion let the student remember that the great act of reproduction consists essentially in two influences—one on the part of the female, the other on the part of the male. The female furnishes the egg or "cell-germ"—and the male imparts life to that egg, through the spermatozoon contained in the seminal fluid; if these spermatozoa are thrown only on the outer portion of the vagina, they may find their way to the egg provided by the female.

ligaments, and correspond below with the pelvic cellular tissue and plexuses of veins.

Besides a mucous membrane, it is composed of a grey tissue and muscular fibres, which are more fully developed about the urethra, and also form the constrictor muscle of the vagina; the muscular structure of the organ is continuous with that of the uterus, and can readily be traced. The grey tissue is extremely vascular, and is composed of elastic and laminous fibres mixed with fibro-cells, which become much increased toward the end of gestation, and assume a remarkable reddish color.*

The vagina derives its arteries from branches of the hypogastric and uterine; the venous plexuses, which are quite numerous, terminate in the hypogastric veins, and its lymphatic vessels pass to the pelvic ganglia.

The vagina receives nerves from the two great divisions of the nervous system—viz. those of organic and animal life; the former are derived from the hypogastric plexus, the latter from the sacral plexus.

2. The *uterus*, although classed among the internal organs of generation, is, in fact, simply an organ of gestation and nutrition for the fœtus. It is intended, as it were, as a sort of domicile or lodging-place for the fœtus, affording it, at the same time, nourishment, until it has received sufficient development to prepare it for an external or independent existence. As a general rule, the act of fecundation is consummated outside of the uterus, and the fecundated germ is brought within its cavity, there to remain and

become developed until the completion of utero-gestation. It is very essential that you should have a clear apprehension of the exact position and relations which the uterus bears to the adjacent organs. It is situated in the pelvic excavation (Fig. 32), with the bladder in front, the rectum behind, the small intestines above, and the upper extremity of the vagina below; the cervix of the organ is com-



FIG. 32.

pletely encircled by the vagina, which forms at this point a cul de sac.

Divisions of the Uterus.—The uterus is divided into its fundus, body, and neck, two surfaces, three angles, and three borders.

Fundus.—The fundus consists of that portion above the transverse line, extending from the uterine extremity of one fallopian tube to that of the other.

Body and Neck.—The body is immediately below this line, and reaches downward to the narrowing of the organ, at which point

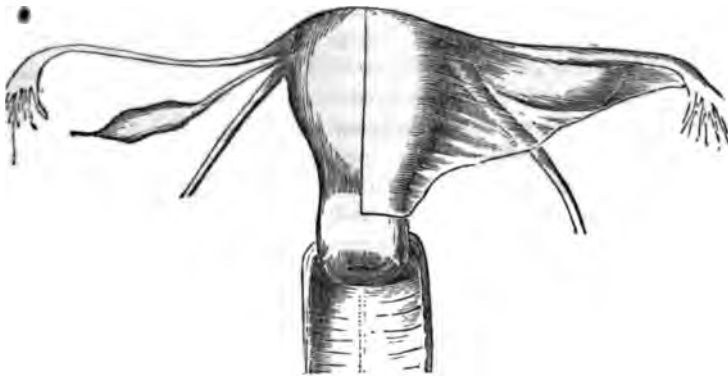


FIG. 32.

is the commencement of the cervix or neck (Fig. 33), which extends into the vagina, and is terminated by the os tincæ.

Surfaces.—The two surfaces are the external and internal—the former is divided into two regions, one anterior, the other posterior. The anterior region is smooth, and slightly convex, while the posterior region presents a greater degree of convexity.

Angles.—The three angles are two superior and lateral, represented by the uterine extremities of the fallopian tubes, and one inferior, represented by the os tincæ.

Borders.—The three borders are one superior, passing transversely from one superior and lateral angle to the other, immediately across the upper edge of the fundus; and two lateral, reaching, on each side, from the superior to the inferior angles of the organ.

Volume of the Uterus.—The size of the uterus varies. In the infant, it is small; in the girl, toward the advent of puberty, it increases in volume, and continues to become developed until the child-bearing period. In the adult woman, its usual length is three inches, and, in its widest portion, about two inches and a half. After the period of child-bearing has passed, it again becomes much less in volume, and not unfrequently exhibits a condition of atrophy. In shape, the organ is pyramidal, and an accurate idea may be gathered of its general form, by dividing a pear longitudinally, the upper portion of the section representing the fundus, the lower the cervix.

Structure.—In structure, the uterus is composite, consisting of

an external coat, an internal coat, an intermediate or muscular tissue, blood-vessels, nerves, and lymphatics.

External Coat.—The external or serous covering is formed by

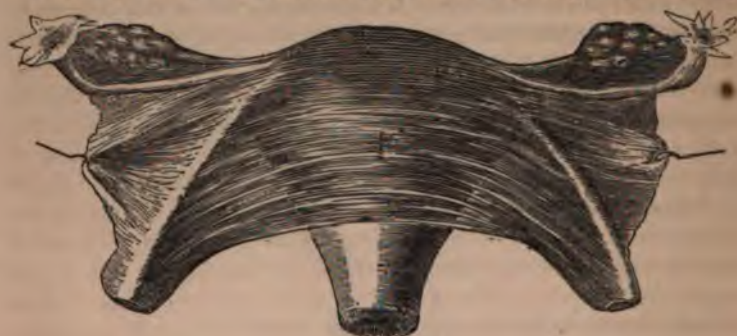


FIG. 34.

that important membrane, the peritoneum, and is arranged in the following manner: It covers only the two superior thirds of the anterior surface of the uterus (Fig. 34), and then reflects upward on the posterior surface of the bladder; this anterior fold of the peritoneum constitutes the *anterior broad ligament* of the organ. The inferior third of the anterior surface, which is not covered by peritoneum, is that particular portion of this surface which, through the medium of cellular tissue, is in adhesion with the base of the bladder. Do not forget, therefore, that the bladder is in union with the lower portion of the uterus; for the recollection of this fact will at once disclose the essential circumstance that displacements of the uterus must of necessity lead, in greater or less degree, to displacements of the bladder; and, again, it will remind you that the direction of the urethra will be modified, during pregnancy, in consequence of the change in the position of the developing uterus.

While only the two superior thirds of the anterior surface of the uterus are covered by peritoneum, the entire of the posterior surface is invested by it, and it even extends to a small portion of the upper and posterior surface of the vagina; it then becomes reflected upward on the rectum, and this posterior fold, or duplication, constitutes the *posterior broad ligament*. You understand, therefore, that the broad ligaments of the uterus are nothing more than anterior and posterior duplications of the peritoneum, and contain muscular fibres, as described by Dr. Charles Rouget; the peritoneum is in close and intimate adhesion with the subjacent tissue of the uterus, except on the lateral borders and posterior surface of the cervix, at which points it is comparatively loose.

Triangular Fossa—Recto-uterine Fossa.—Allow me, for a moment, to direct your attention to an important space, or fossa, situated between the posterior surface of the uterus, and the anterior sur-

face of the rectum; it is sometimes called the *triangular fossa*—I think a better name for it is the *recto-uterine fossa*, for the reason that this name explains its position, and the manner of its formation. The important practical feature connected with this fossa is, that sometimes the ovary, and, at other times, the small intestines, become prolapsed into it, giving rise to much disturbance, and, therefore, requiring a prompt and careful diagnosis; it also is, occasionally, the seat of a bloody tumor—recto-uterine hæmatocele; and there may, under certain circumstances, be a mass of fatty tissue in the fossa which might readily be mistaken for a tumor.*

Internal Coat.—The internal or mucous lining of the uterus has given rise to much controversy touching its true character; and it has been emphatically denied, by eminent anatomists, that it possesses the attributes of a mucous surface. Now, however, since the admirable delineations of Coste, it seems to be very generally conceded that it is, in truth, a mucous tissue. It seems to me that all we desire to know for practical purposes is, whether, in health, this surface exhibits the functions, and, in disease, presents the pathological phenomena peculiar to a mucous membrane. That this is so, no one, I imagine, will pretend to deny. Therefore, it may be safely assumed that the uterus is lined by a mucous tissue. It is not uniform in its whole extent; it is extremely thin toward the orifices of the fallopian tubes and the internal orifice of the cervix, while toward the centre of the cavity of the organ, it is remarkable for its thickness. It is in strong adhesion with the proper structure of the uterus itself; nor does there appear to be any sub-mucous cellular tissue connecting it with this structure; hence the firmness of its union. Under the microscope, there is distinctly observed a columnar epithelium covering the membrane, and innumerable small openings, which are the orifices of the follicles so abundantly distributed over its surface. These follicles appertain both to the body and cervix of the organ; in health they secrete mucus, intended to moisten and lubricate the parts, while, under morbid influences, they pour forth a muco-purulent, and, sometimes, an exclusively purulent discharge. The follicles situated in the neck of the organ secrete, in a normal state, a thick and alkaline mucus, which, remaining in and distending the cavity of the follicle, it is now understood, gives rise to those true cysts so improperly named *glands* of Neboth, to which we shall again refer when speaking of pregnancy, and the modifications of the uterus under its influence.†

* See *Diseases of Women and Children*, pp. 224, 297.

† According to Virchow, the mucous membrane of the uterus is usually covered with ciliated epithelium; but during pregnancy the layer of ciliated cylinders is replaced by one of squamous epithelium. [Virchow's Cellular Pathology, 2d edit., London, 1860. p. 71.]

Intermediate Tissue.—The true nature of the intermediate tissue of the uterus was, in former years, also a question of obstinate debate; some maintaining that it was muscular; others, on the contrary, denying to it any of the attributes of muscularity. At the present time, however, this question is no longer one of controversy; science has decided the point, and no one now doubts that the uterus possesses a muscular structure. The fact is demonstrated by anatomy, physiological experiments, the phenomena of parturition, and chemical analysis—the latter showing, conclusively, that its components are those of muscular tissue. In a word, nothing, it seems to me, is better settled than that the uterus is endowed with this structure, and that, in form and in action, it is essentially a hollow, or orbicular muscle. Koelliker, in his recent researches, has proved that the muscular fibres of the uterus are, in correspondence with the fibres of all the other muscles of organic life, composed of elongated cells, more or less adherent to each other. The uterus, therefore, in addition to affording accommodation to, and providing nourishment for, the fœtus, during its intra-uterine or dependent existence, accomplishes, at the proper time, its birth through an expulsive force derived, in part, from the contractions of its muscular tissue.

Is the Uterus an Erectile Organ?—Until the recent researches of Dr. Charles Rouget,* there was more of hypothesis than of certainty, as to whether the uterus is entitled to be classed among the erectile organs. Admitting the generally conceded fact, that the copulative organs of the mammiferous class of both sexes exhibit, in certain conditions, changes of form, volume, and, sometimes, of position, due to the temporary distension of blood-vessels,† which, under ordinary circumstances, are but incompletely filled, this observer proceeds to point out the error of authors in explanation of these changes. He maintains that in employing the terms erection, turgescence, and sanguineous congestion, as meaning the same thing, a cardinal blunder has been committed, for the reason that, while all the parts of the circulatory apparatus may become congested, those only, possessing the special anatomical disposition of cavernous or spongy bodies, can be thrown into erection. On the other hand, anatomists, forgetting that the erectile cavernous bodies are not merely an assemblage of numerous and large veins, have described as erectile organs certain muscular formations, in which they have detected nothing but venous plexuses more or less abundant. This is a capital error. Rouget has proved that there is, in fact, no such thing as a *special*

* Recherches sur les Organes Erectiles de la Femme, et sur l'Appareil Musculaire Tubo-ovarien, par Dr. CHARLES ROUGET. Journal de la Physiologie, par E. BROWN-SÉQUARD. 1858. p. 320.

† A striking illustration is afforded by the penis and clitoris.

erectile tissue, and that every erectile organ is, in reality, simply a muscular organ, in which the blood brought by the arteries may be temporarily retained in the capillaries, or veins, transformed into venous sinuses, and retiform plexuses.

The first and most essential condition, therefore, in erectile formations is, that the dimensions and number of the vascular canals be such that their state of repletion, or comparative emptiness, may determine changes in the form, volume, or position of the organ. A second condition is the peculiar arrangement of the arteries and veins. The third condition, indispensable to the mechanism of erection, is the presence of muscular fasciculi, which, commingling with the vessels, become the necessary agents of the erection itself.

But the entire uterus is not erectile—this physiological attribute belongs only to the body of the organ, because of the peculiar distribution of the blood-vessels on that portion of the viscus, as will be immediately shown.

Blood-Vessels of the Uterus.—The arteries of the womb are derived from two sources, viz. the ovarian and uterine. The former usually pass from the aorta just below the origin of the renal arteries; they descend along the vertebral column, behind the peritoneum, and in front of the psoas muscles and ureters; they then pass between the folds of the broad ligaments, divide into several branches, and supply the cervix, body, and fundus with blood, anastomosing in the latter portion of the organ with branches of the uterine arteries. These latter, the uterine arteries, one on each side, are given off by the hypogastric or internal iliacs, proceed to the lateral portions of the uterus, and, in conjunction with the ovarian vessels, distribute themselves through the substance of the organ. Previous to puberty, these arteries are extremely small, and convey to the uterus but little blood, for the reason that this organ is without function, and needs no more blood than is simply necessary for its nutrition. Indeed, in this particular they may be regarded, in some sense, as analogous to the two branches of the pulmonary artery during fœtal life; these convey to the lungs of the fœtus, which are also without function, just blood enough to maintain their vitality. As soon, however, as respiration is established, and the fœtus commences its independent existence, the surplus blood, which before was carried through the ductus arteriosus to the aorta, passes through the right and left branches of the pulmonary artery, respectively, to the right and left lobes of the lungs, for the purpose of decarbonization. So, also, when puberty has been attained, the blood-vessels of the uterus have new duties to perform; the wants of the organ are more pressing, because its specific function—menstruation—commences. Hence, there is a monthly sanguineous congestion

of the ovaries and uterus. It is an interesting fact to bear in mind, that the body of the uterus is much more abundantly supplied with blood than any other portion of the organ—the arterial branches exhibiting themselves in great number, and becoming spiral, or tortuous.

The veins, too, are very numerous and large, both the arteries and veins presenting, on the body of the organ, that peculiar arrangement characteristic of erectile formations. The chief supply of the menstrual blood comes from the body of the uterus, and it is during the catamenial periods that its erectile properties are developed. It is worthy of note that the uterine veins are without valves; and this circumstance, together with the peculiar position of the uterus preventing the free return of venous blood, is oftentimes a predisposing cause of undue congestion of the organ, thus exciting in it more or less disturbed action.

Lymphatic Vessels.—The lymphatic vessels communicate with the pelvic ganglia, and those of the cervix communicate, also, with the lymphatics of the anterior portion of the vagina. You will occasionally observe, in carcinoma, and other affections of the cervix uteri, engorgements of the inguinal glands; and this may be explained by the anomalous distribution of these lymphatics, to which attention has been directed by certain writers. In metritis, supervening upon childbirth, the lymphatic vessels of the uterus will frequently be found filled with pus.

Nerves of the Uterus.—The uterus is supplied with nerves from the ganglionic and cerebro-spinal systems; the former, the ganglionic nerves, come from the renal and hypogastric plexuses, and are distributed throughout the structure. The cerebro-spinal nerves are furnished by the sacral plexus, and distributed by anastomosis through the organ. It has been very positively denied that the uterus receives any nerves whatever from the cerebro-spinal axis, and one of the most formidable advocates of this opinion is M. Bouillaud. Jobert maintains that the projecting portion of the cervix uteri is entirely deprived of nerves, and is, under all circumstances, insensible.

As to the insensibility of this part of the cervix in some cases, he is, perhaps, not altogether wrong; but to allege that it never becomes the seat of pain is at variance with actual experience.* To the opinions of Bouillaud and Jobert may be opposed the researches

* There is no reason to be surprised at the fact, that the neck of the uterus is deprived of sensibility in a normal condition, and becomes very sensitive in cases of disease. Many portions of the human structure exhibit the same peculiarity; for example, the tendons, the periosteum, the dura mater, etc., are without sensibility when in a normal state, but when inflamed, are exceedingly painful. It need scarcely be added, that Jobert is altogether mistaken in stating that the neck of the uterus is deprived of nerves.

of Hunter, and, in our own times, of Tiedemann, Robert Lee, Müller, Hirschfeld, Boulard, and others, who have positively recognised in the uterus—in the cervix as well as in other portions of the organ—distributions of the cerebro-spinal nerves.

It is an important question whether the nerves of the uterus become enlarged and more numerous during pregnancy, or whether they retain the peculiarities, which marked them when the organ was in a state of vacuity. This question provoked rather a warm controversy between Dr. Robert Lee and Dr. Snow Beck. The former, after Tiedemann, endeavored to prove that the increase, both in number and volume, is considerable; while Dr. Beck, after J. Hunter, denies this altogether, and maintains that the increase is only in appearance, predicated his argument on the revelations of the microscope, which, he says, show that the neurilema and certain fibrous bands connected with it, have been mistaken for nerves. However this question may ultimately be decided, there is one fact, which, from analogy, would seem to give strength to the view of Dr. Lee, and it is this, that in hypertrophy of the muscles of animal life—and the same thing is observed in hypertrophy of the heart, first pointed out by Dr. Lee, and subsequently confirmed by an able German micrographer, Dr. Cloetta—there is actually an increase in the number and size of the nerve fibres.

Cervix.—Before terminating the anatomy of the uterus, I desire to say a few words with regard to the cervix or neck of this organ, because it has certain practical bearings well worthy of consideration. In the first place, the cervix is divided into two distinct portions; the superior and inferior. The former is called the *uterine* portion; the latter the *vaginal* portion. The uterine extremity is that particular part, which unites with the body of the uterus, while the vaginal or inferior extremity is represented by that portion of the organ, which is found projecting into the vagina. I shall remind you, when speaking of the changes in the uterus consequent upon gestation, that it is not until about the fifth month that the cervix begins sensibly to shorten, in order to afford accommodation to the developing germ, and, also, that the shortening commences at the *uterine* portion of the neck, and not at the *vaginal* portion, as is maintained by Stoltz and others.

With the recollection of this circumstance, is associated a most important practical fact, and it is this—in placenta prævia, women are very apt to have slight hemorrhage at the fifth and sixth months of their pregnancy, which may continue to increase, more or less, until the gestation is completed. The connexion between hemorrhage at this time and placenta prævia is explained as follows: as soon as the uterine extremity of the cervix begins to shorten, it necessarily does so, by having its respective diameters increased; but this very increase is accomplished at the cost of one or more

of the utero-placental vessels, which, in placental presentation, are between the internal surface of the cervix and the placenta. I do not mean to be understood that all women, who are attacked with hemorrhage at the fifth and sixth months of gestation, have the placenta implanted over the mouth of the uterus; there are other causes capable of occasioning bleeding at this period, such as threatened abortion, severe concussions, etc.; but what I wish to inculcate is, that, in the event of hemorrhage occurring, you should have your attention awakened as to the possibility of its being connected with placenta prævia. The treatment of this form of bleeding will be discussed in a subsequent lecture.

Volume and Form of Cervix.—The volume and form of the cervix are much modified according to the age of the individual, and these changes are not without interest to the obstetrician. Before puberty, it is extremely small and dense, and presents a conical shape; at the advent of puberty, on the contrary, when the uterus becomes a new centre of action, as preliminary to the institution of the menstrual function, there is a perceptible increase in the size of the cervix, and its structure is marked by less density. Until this period, the os tincæ is only partially developed, and it is not until the age of eighteen or twenty that the cervix begins to increase in its transverse diameter, so that, at this time, the two lips, the anterior and posterior, become readily recognised.

I shall not at this time speak of the modifications of the cervix during the progress of pregnancy, but it is well to remember that, as a general rule, after childbirth, the cervix rarely resumes its original form and size; it becomes shorter and larger, and there will be found on the surface of both the anterior and posterior lips small irregularities, which are nothing more than so many cicatrices, resulting from the rupture of the mucous membrane of this part at the time of the passage of the fœtus through the os uteri. One word in reference to these cicatrices; although they may be said to be the ordinary and characteristic results of childbirth, and are held by some medical jurists as very positive evidences of previous pregnancy, yet it is my duty to caution you against a too implicit reliance on these cicatrices in questions involving the character of the female. They will sometimes ensue from congestive dysmenorrhœa, and from disease of the cervix, such as hyperæmia, ulceration, etc. I maintain, therefore, that, in all discussions in which the honor of the party may be involved, in the absence of other and substantial proof, these cicatrices should not be regarded as of final weight, for the broad reason that the civil as well as the moral law recognises every doubt to be the property of the accused.

The Round Ligaments.—The round ligaments, one on each side, composed of muscular fasciculi, arise from the sides of the fundus of the womb, in front of, and just below, the uterine portion of the

fallopian tubes and the labia externa; passing between the anterior and posterior duplications of the broad ligaments, they proceed outward, through the inguinal canal, and expend themselves on the mons veneris (Fig. 34). These ligaments, from their position and direction, afford support to the uterus against the encroachments of the distended bladder; for, if it were not for them, the uterus would be much more frequently retroverted when pressed backward by the bladder filled with urine. In proportion as the bladder presses the uterus backward the round ligaments constitute, as it were, a sort of antagonism maintaining the organ in its position; and it is only in the event of the antagonism being broken up by a surrender of the force thus exercised by the ligaments, that the fundus of the womb is thrown backward, or retroverted. It was supposed by an ancient writer that the special office of the round ligaments is, during the act of coition, to draw the os tincæ downward, in order that it may be placed in juxta-position with the glans penis; but this hypothesis cannot be sustained, for the reason that if, during sexual congress, the round ligaments did, by their contraction, influence the position of the uterus, the direct result of such influence, instead of causing the os tincæ to descend, would be to draw it upward, because the free extremities of the round ligaments are more elevated than those which pass directly from the uterus.*

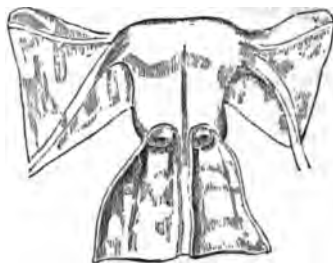


FIG. 35.

The Fallopian Tubes.—The fallopian tubes, two in number, originate from the lateral and superior angles of the uterus, with which organ they communicate by continuity of canal; they are from four to five inches in length, and form a communication between the ovaries and uterus, transmitting the fecundating element to the ovaries, and, after fecundation has been accomplished, conveying the germ to the uterine cavity (Fig. 36). These tubes terminate by a free or fimbriated extremity, to which we shall more particularly allude in the succeeding lecture. The structure of the tubes is, externally, a serous or peritoneal coat; internally, a mucous investment without follicles, and covered by columnar epithelium with vibratile cilia; and intermediately, a muscular tissue,

* The uterus will sometimes exhibit a variety of malformations; on the other hand, there are well authenticated instances in which no vestige of the organ has been recognised. Occasionally, there will be two uteri with but one vagina; while, again, there will be two distinct uteri (Fig. 35) and two vaginæ. This latter variety is of especial interest because of the possibility of a simultaneous double fecundation, which might be mistaken for superfœtation.

arranged in circular and longitudinal fibro-cells, thus causing, through their compound action, the tube to convey the germ from the ovary to the uterus. The fibres of the tube remain



FIG. 36.

distinct from those of the uterus, in the walls of which they can be easily detected. It may be mentioned, in passing, that, at the fimbriated extremity of the tube, sometimes called the *morsus diaboli*, there is a meeting of the serous and mucous membranes, the only example of a junction of these two tissues in the entire economy.*

The Ovaries.—The ovaries are two almond-shaped bodies, situated laterally to the uterus, with which they are connected by the ovarian ligaments (Fig. 34). They are essentially the organs of generation in the female, and, hence, have been called the *testes muliebres*. Without the ovaries, fecundation is impossible, for the reason that their special office is to provide the ovule or “germ-cell.” This is well understood by farmers, who, when they wish to prevent breeding in their sows, spay them, or, in other words, extirpate the ovaries. These bodies are composed of a peculiar structure; 1. A dense fibrous membrane, containing, according to Rouget, some muscular fibres; this membrane—the tunica albuginea—is closely invested by the peritoneum, except at one point, the *hilus*, through which nerves and blood-vessels enter the ovaries; 2. The proper tissue of the gland, known as the stroma, essentially composed of areolar fibres and blood-vessels commingled with muscular fibres, which are quite numerous; 3. The Graaffian vesicles, in all the stages of their development, the largest containing a limpid fluid and the “germ-cell” or ovule. Even in a newly born infant, these vesicles are found in the ovaries, but they acquire their full development only at the age of puberty, and then

* It is at this point, that there is a communication with the peritoneal cavity, through which injections thrown into the cavity of the uterus have sometimes passed, and caused a fatal peritonitis. This opening is called the *ostium abdominale*.

only do they contain ovules capable of being fecundated. When the ovule has attained its maturity, the ovisac opens, and affords an escape to the fluid which it contains, as well as to the ovule or "germ-cell;" this latter, should it become fecundated, is conveyed by the fallopian tube to the uterus, where it awaits its preparation for external or independent existence. Should, however, fecundation not be accomplished, the ovule is equally conveyed to the uterus, and passes off with the menstrual fluid. As to this latter fact, there is very little doubt entertained: indeed, it is now the generally received doctrine.

Besides the true "germ-cell," inclosed in the ovisac or Graaffian vesicle, there are, even in early childhood,* a number of immature ova observed in the ovaries. The escape of the ovule from the ovisac, whether fecundated or otherwise, gives rise to a peculiar formation known as the *corpus luteum*; hence, there is the *corpus luteum* of pregnancy, and the *corpus luteum* in no way connected with that condition. The doctrine was formerly entertained that the *corpora lutea* observed in the ovary were always proportionate in number to the children born of the female. But the inaccuracy of this opinion has yielded to the march of science. According to the researches of Coste, the corpus luteum attains its maximum volume about the third month of pregnancy; from this period up to delivery, it becomes atrophied, so as to present at that time about a third of its volume; from forty to sixty days subsequently, it is reduced to a hard and small nucleus, which continues more or less.† The corpus luteum of menstruation is usually of small size, and completely disappears after a month.

I may refer those of you who are anxious for some interesting scientific details upon this subject, to the researches of our distinguished countrymen, Drs. Meigs‡ and Dalton; and, also, to Dr. Montgomery, of Dublin, who, in the second edition of his valuable work on pregnancy, has discussed the subject very fully and to the point. When treating of reproduction, in a future lecture, I shall again speak of the *corpus luteum* in its varied relations.

* It appears that, during the period of childhood, there is a continual rupture of the ovisacs (or parent cells), and a discharge of ova on the surface of the ovarium, but these ova never attain so high a degree of development, as to render them fit for impregnation, the evolution necessary for this latter process not occurring until the period of puberty. [Carpenter's Elements of Physiology, p. 449.]

† The exact period of its total disappearance I am unable to state; but I have found it distinctly visible so late as the end of five months after delivery at the full time, but not beyond this period. [Montgomery's Signs and Symptoms of Pregnancy, p. 453.]

‡ Transactions American Philosoph. Soc.

LECTURE VII.

Functions of the Uterus and its Annexæ—Essential to Health, but not to Life—Forces in the Female Economy two-fold—Proof—Uterine Organs before and after Puberty—Indications of Puberty—Menstruation—Meaning of the Term—Age at which First Menstruation occurs—Influences which Promote and Retard it—Girls in the Country contrasted with those in the City—Influence of Race on the Menstrual Function—Menstruation in young Children—Tardy Menstruation—Cause of Menstruation—Conflicting Opinions—The Menstrual Function dependent on Organic Development—Menstruation does not consist in the Discharge of Blood, but in the Maturity of the Ovules—Ovular Theory—Dr. John Powers's Claim—Periodicity of Menstruation—How explained—Is the Menstrual Fluid an Exudation, or Secretion?—Is it Blood?—Does it escape by Endosmosis?—The Source of the Menstrual Discharge, and its true mode of escape—Menstrual Blood in the Uterus and Vagina—Difference between—On what the Difference is dependent—Duration of each Menstrual Period, and Quantity Lost—Is Menstruation peculiar to the Human Female?—General Properties of the Menstrual Discharge—Period of Final Cessation—Why called the Critical Period—Aptitude in the Female for Impregnation—Case of Catherine de' Medici—Early Marriages in India.

GENTLEMEN—Having completed the anatomical description of the uterus and its annexæ, it is now proper that we should consider their special functions, or physiological offices. It may, indeed, be said that these organs at first—so far, at least, as their peculiar or special physiology is concerned—form only in structure a portion of the economy; in all other respects they are, as it were, lost in slumber, not being called upon to participate in the important movements of the system until the advent of puberty. Prior to this period, these organs receive their nutriment from the blood which traverses their tissues, but they do nothing in return, for the simple reason that their time of action has not yet arrived. This, therefore, constitutes one great peculiarity of the uterus and its appendages, and marks the difference between them and many of the other textures of the human mechanism. In strict truth, even after they have entered on the round of physiological duty, they are not necessary to life, for this can be maintained without their aid—but they are essential to health. This cannot be said of the lungs, nor of the heart, and so, you perceive, the broad difference between these viscera and the organs peculiar to the female is this—that the functions of the former are material to life, and, therefore, commence at the birth of the individual; while those of the latter,

not being essential to life, are not brought into exercise until the age of some twelve or fifteen years.*

There is another interesting fact connected with this subject, too important not to be noted. The heart, lungs, etc., not only commence their offices at birth, but they are allowed no cessation, night or day. Through the whole period of existence they must be in constant and unbroken action, for the tenure of human life is the fidelity with which these offices are discharged. If the heart cease to beat, or the lungs to act, the whole mechanism, in its exquisite and wonderful arrangements, instantly becomes arrested, and in this arrest death finds its triumph! Therefore, it is manifest that, in the human economy, there are two kinds of function—the one commencing at birth, and necessary to the maintenance of life, is continuous; the other, originating at a period remote from birth, though material to health, is not so to life, and is, moreover, as we shall show you, periodical in its recurrence.

Reciprocal Relations of the General and Uterine Systems.—Indeed, I am disposed to think that, without any infringement of physiological law, we may divide the forces which regulate the vital action of the female into two classes; one of these will appertain to the general system; the other belongs to the uterine system. After puberty, and until the child-bearing period of the female has been completed, there is a reciprocal and necessary relation between these two forces, which should never be permitted to escape the attention of the practitioner. Without an appreciation of this relation, he will be at a loss to account for the various constitutional disturbances so frequently dependent upon either organic or functional disease of the uterine organs. He will mistake phantoms for realities—he will treat symptoms for causes, and thus bring a blight upon his name, and discredit upon his profession.

By way of illustrating, let us suppose the following case: A lady is attacked with epilepsy, hysteria, or even mania. Now, I contend that either of these forms of nervous disturbance is, in nine cases out of ten, a product, or, if you choose, an effect, traceable to its antecedent, or cause. It is, therefore, very rarely a primary or idiopathic, but almost always a secondary or symptomatic trouble. Suppose you should be called to attend this lady, after others had in vain attempted to relieve her; and, with a full and common-sense investigation of all the circumstances of the case, you should discover that, from cold, or some other cause, her menstrual evacuation had suddenly become suppressed, and that the

* The period of the menstrual function is generally embraced between puberty and the time of its final cessation, and may be said to extend from twelve or fifteen to forty-five or fifty years of age, which would, therefore, make its usual duration about thirty years.

suppression was very shortly followed by one or other of the above nervous aberrations? What, allow me to ask, with this important light to guide you, would be your diagnosis—and what your plan of treatment? You would see, with the rapidity of thought, that the epilepsy, hysteria, or mania, was due to the suppression—and, as consistent men, your remedies would be directed, not against the nervous disturbance, which is simply the phantom, or product, but against the suppression, which constitutes the entire cause of the derangement.

But let us, by another illustration, see how it oftentimes happens that the uterine system itself is dependent, for its proper regulation, upon the force supplied to it by the general economy. Here, for example, is a girl seventeen years of age, who has never menstruated; she is pale, leuco-phlegmatic, bloodless, presenting a true picture of anæmia. Why does she not menstruate? Is the amenorrhœa, in this case, a cause, or an effect? If you be of opinion that it is the former, you will administer emmenagogues, and thus fritter away, in the abortive hope of doing good, the little remaining strength of your patient. But if, as sensible men, you perceive, at a glance, that the absence of the menstrual function is simply a result dependent upon a dilapidated condition of the general health, thus depriving the uterine organs of their proper supply of healthy nutriment, through which they derive the necessary nervous stimulus for the institution of the catamenial function; if, I repeat, you regard the amenorrhœa as the direct effect of this broken-down condition of the general health, you will not address your remedies to the uterus, but at once, by hygienic and other measures, endeavor to improve the digestion, so that good blood may be elaborated, and sent throughout the economy imparting to every tissue nutrition and development; in the accomplishment of these latter objects the catamenia become established, and the health of your patient is secured. So much for the reciprocal relations between the general and uterine systems.

The Genital Organs at the Time of Puberty.—I have told you that, before puberty, the uterus and its annexæ are insignificant, and form, only in structure, a portion of the general mechanism. As soon, however, as this important era, puberty, has arrived, new fires are kindled, new life imparted, new hopes created, and the girl enters upon a new mission. Her whole character is changed—she has passed from childhood to womanhood. Instinct tells her that she is now an active member of the great human family, with sacred duties, and no less sacred obligations imposed upon her. This change in her physical condition brings about corresponding changes in her moral bearing—she is no longer a child, sportive, rollicking, and irresponsible. If I may so term it, her sex is defined—and there is an inherent sense, which admonishes her that

dignity and reserve are now to take the place of levity and childish confidence.

As the period of puberty approaches, remarkable modifications will be observed in the physical appearance of the girl; she gradually loses the form and figure of the child, and assumes, through the rapid and successive development of certain tissues, the full and comely aspect of the woman; the uterine organs increase in volume: the pelvis receives an enhanced growth; the hips spread; the breasts enlarge; the pubes is covered with hair; there is a sensation experienced in the generative organs to which the girl was previously a stranger, the direct consequence of the increased afflux of blood to them; and it is not unusual, at this period, to find more or less mucus secreted, giving rise to a moisture, and, sometimes, a discharge from the vagina. The changes which I have just enumerated are generally accompanied with more or less disturbance of the general system—such as headache, restlessness, constipation, loss of appetite, depression of spirits, neuralgia in one or other of its numerous forms, febrile excitement, hysteria, and other grades of nervous perturbation. Now, gentlemen, the interesting fact for you to remember is, that all these changes in the generative organs, this increased development of the tissues, and the constitutional derangements to which we have alluded, are but so many preludes to the institution of a function perhaps, in many respects, the most important in the economy of the female—I mean *menstruation*.

Menstruation.—The term menstruation is usually, but improperly as we shall explain, defined to be a periodical or monthly discharge of blood from the vagina, commencing at the time of puberty, as a general rule, and continuing, except during pregnancy and lactation, throughout the child-bearing period. It has been attempted by certain writers to show that menstruation is the offspring of civilization; but so far from this being so, the function occurs in women of every race, and in every condition of life; and, moreover, in the earliest written record it is referred to thus: “And Rachel said to her father—Let it not displease my lord that I cannot rise up before thee, for the custom of women is upon me.”* When this function becomes established, it is ordinarily the silent, but emphatic declaration of nature that the female has attained her maturity, and is now prepared, by her physical development, to carry out one of the objects of her mission—the reproduction of her species. The age at which menstruation manifests itself for the first time is by no means uniform, and will be modified by various circumstances, such as climate, education, mode of life, temperament, constitution, and race.

Climate.—The influence of climate on the early or late appearance of this function was, previously to the researches of Mr.

* *Genesis*, chap. xxxi.

Robertson,* supposed to be very decided; and the general opinion prevailed that girls, under the torrid zone, menstruated much earlier than those born in temperate, and higher latitudes. Mr. Robertson, however, has shown that the extreme difference in the time of the first menstruation in very hot and very cold climates is only three years; thus, in Calcutta, the mean age is between 12 and 13, while in Labrador it is within a fraction of 16. In Jamaica, it is 14; at Bombay, 15. At Christiania and Copenhagen, according to Dr. Faye, it is between 16 and 17; in Paris, and London, between 14.50 and 15; and at Lyons, 13. It, therefore, will be seen that the influence of climate is much less than was formerly supposed.

The annexed table, derived from Dubois and Pajcot,† exhibits some interesting data on this subject. It embraces observations made on six hundred women, in different climates, in reference to the period of the first menstruation:

Age.	Warm Climate.	Temperate Climate.	Cold Climate.
	<i>Southern Asia.</i>	<i>France.</i>	<i>Northern Russia.</i>
Number of Women Menstruating for the first time.			
8 years	3	0	0
9 "	9	2	0
10 "	19	8	1
11 "	86	26	3
12 "	148	42	6
13 "	135	64	18
14 "	96	82	56
15 "	52	99	114
16 "	25	96	114
17 "	16	76	90
18 "	3	50	78
19 "	3	25	56
20 "	2	18	33
21 "	1	6	17
22 "	1	3	10
23 "	1	1	3
24 "	0	2	1

Thus it appears that the average age at which menstruation first appears in warm climates, is 12 years, 11 months, and 21 days; in temperate climates, 15 years, 3 months, and 17 days; in cold climates, 16 years, 7 months, and 27 days.

Education and Mode of Life.—Girls in the country, whose habits are more in accordance with the ordinances of nature, menstruate later than those brought up in the city; and this difference is readily accounted for. The former are frugal in their habits, retire early, and rise with the sun; they are independent in feeling, and in action; their moral and physical education is usually calcu-

* *Essays and Notes on the Physiology and Diseases of Women.* London, 1841.

† *Traité complet de l'Art des Accouchemens* par MM. Dubois et Pajcot, p. 325.

lated to improve the mind, and fortify the body. They live in the open air, and are more or less constantly in exercise; in a word, their nervous system is strengthened, and they exhibit, not only in their personal appearance, but also in their very movements, the evidences of physical health; they, indeed, are the living portraits of nature's own daughters.

How different is it with those born and educated amid the tinsel and excitements of city life! Look at our metropolis, New York, with its enterprise, its commercial prosperity, its immense wealth, its princely edifices, more like the palaces of the old world, than the unpretending structures of an infant but mighty Republic—look, I say, at all these things—the products of successful enterprise, and indomitable energy—and then turn to the pallid cheek and wasted features of those interesting creatures who are to do the honors, and constitute the gems, of these magnificent domicils. In this contemplation, the philanthropist will find cause enough for lamentation; he will see that city life, with its rounds of excitement, its prurient books, and no less prurient dance, has forced into premature action the nervous system of the young girl, and thus entailed upon her the melancholy results of this contravention of the laws, which nature has declared essential to health. The life of the young girl, moved and swayed by the constant and exciting currents of city habits, is a life purely artificial; it is without substance, destructive alike to health and happiness, and too often without a redeeming feature to relieve the retrospect. You appreciate, therefore, why it is that the catamenial function occurs earlier in girls surrounded by, and participating in, the follies and excitements of the metropolis; these excitements tend directly to force into early development the nervous system, and under their prurient influence the sexual organs are stimulated to premature and sickly maturity; hence there is, oftentimes, a premature and sickly exhibition of the menstrual function.*

Temperament, Constitution, and Race.—Temperament and constitution, under given circumstances, will exercise their agency in the early or late appearance of this function. Girls of a nervo-sanguineous temperament and robust constitution, will menstruate earlier, all things being equal, than those of an opposite condition of system. The influence also, of race is very remarkable, and appears to resist all the other circumstances known to modify the late or early development of the menses; for example, it has been

* Briere de Boismont, in his full and excellent paper on menstruation, states that in Paris, among the daughters of the wealthy, the age of the first catamenia is thirteen years and eight months; and, among the poor, fourteen years and ten months. It was observed in Vienna, by Dr. Szukias, that in 665 women born in the city the mean age was fifteen years eight and a half months; while, in 1610 from the country, it was about sixteen years two and a half months.

shown by Raciborski and others, that if a husband and wife, natives of New York for instance, should reside in the East Indies, and have children there, no matter how long the period of residence, even if it extended to six or more generations, the daughters will continue to menstruate, not at the period usual for girls in the East, but in correspondence with the time at which this function usually occurs in the native homes of their parents; and so, also, the reverse of this is equally true.

Precocious and Tardy Menstruation.—There are examples, recorded in the books, of menstruation occurring in young children; but these, I think, should not be accepted without some qualification. One of the most remarkable cases I have read of, is related by Dr. D. Rowlett, of Kentucky;* “Sally Deweese was born in Butler County, Kentucky, 7th of April, 1823; at twelve months of age she menstruated, and continued to do so regularly until 1833, when she became pregnant; on the 20th of April, 1834, she was delivered of a healthy female child, weighing seven and three fourth pounds.” Other writers have also cited some extraordinary instances; Briere de Boismont mentions two cases; in one, menstruation commenced at the third month, in the other at the third year. D’Outrepont records one at nine months; the infant had protuberant breasts, and menstruated every four weeks until her death, which occurred in the twelfth year of her age. Whatever credit may be placed on these and other recorded examples of menstruation in children, it is very evident that they should be regarded as extremely rare exceptions. Not so, however, with the cases of tardy menstruation; I have known several examples of young women, in the enjoyment of good health, in whom the function did not appear until the nineteenth, twentieth, and twenty-second year; there was one case of a female, who appeared at my clinic, and who, if her statements are to be relied upon—and after rigid scrutiny I could detect no motive for fraud—did not menstruate until she was thirty-three years of age; she married at thirty-five, and was delivered of a healthy living child sixteen months from the day of her marriage.

Causes of Menstruation.—In referring to the various and conflicting opinions advanced by authors to explain the cause of the menstrual discharge, we cannot but be struck with two facts: 1. The manifest want of agreement; and 2. The absurdities to which mere hypothesis will oftentimes lead its supporters. Some ascribe the menstrual crisis to the influence of the moon; others say that it is produced by general plethora of the system; while others, again, maintain that it is due altogether to local plethora; and so we might proceed to enumerate the different theories which

* Transylvania Journal of Medicine for October, 1834.

have been projected on this subject—but *cui bono*? Women menstruate not only at every phase of the moon, but they menstruate every hour and day in the year. What, then, becomes of this supposed lunar influence—a doctrine, I may mention, of very ancient date, and which has been warmly defended by some of the early fathers. Again: you will occasionally see females in infirm health, the very opposite of plethora, have their menstrual turns with more or less regularity; but why should this be so, if the menstrual function be owing to general vascular fulness of the system—a doctrine which, also, has had its eloquent advocates? If this hypothesis of plethora be true, why could not menstruation be completely arrested by the abstraction of blood, upon the principle—*causâ sublatâ tollitur effectus*; but we know very well, from practical observation, that, in certain engorged conditions of the economy, loss of blood, either generally or locally, is sometimes the most prompt and efficient remedy to bring on the catamenial flow. A truce to theory, and let us come to facts.

When a girl menstruates, it is because she has attained a point in her physical development, which enables her to perform this function. Function, in a physiological acceptation, is the specific act accomplished by, and peculiar to, a given organ. For example, the lungs decarbonize the blood; the liver secretes bile; the kidneys urine; the heart receives into its right cavities venous blood, and throws from its left cavities arterial blood. These, together with numerous others, are functions which, more or less, commence with the birth of the child, and which also are, more or less, directly connected with the maintenance of life. They, therefore, differ from the menstrual function in the broad fact that the latter does not manifest itself until some years after the birth of the being; and while its periodical recurrence is material to the health, it is not, as I have before remarked, essential to the life of the individual. Now, it appears to me, that the true explanation of the cause of menstruation consists in the elucidation of the simple question, viz. Why is not the function of menstruation, like the functions of the lungs, heart, and kidneys, simultaneous with the birth of the child?

The solution of this interrogatory is, in my opinion, the only philosophical explanation of the cause of menstruation; and we proceed, therefore, in a very few words, to answer it. As soon as the child is born, and its existence becomes independent, the lungs commence their office of decarbonization, simply because the lungs are developed and prepared for this duty; the heart receives venous blood, and disposes of arterial blood, because the heart is developed and fitted for this office; the liver secretes bile, and the kidneys urine, for precisely the same reasons. But the difference with menstruation is this—it, like the other functions, is the offspring, if I may so speak, of organic development; and the reason

that it is not coexistent with birth, and does not become established until a later period, is, that the organs, of which it is the specific function, have no physiological existence—that is, they lack physical development, and, therefore, have not yet become participators in the acts of the system. These organs are the ovaries, the essential and only organs of generation strictly so-called in the female. The development of the ovaries occurs at the period of puberty, and then it is that their physiological action commences.

At this time, you will observe on the surface of these bodies, the Graaffian vesicle, containing the ovule, which, I have told you, escapes ordinarily with the menstrual blood. As these ovules on the surface become matured, the ovary itself forms the centre of a sanguineous afflux, a veritable congestion, in which the fallopian tubes and uterus participate; this congestion, as a general principle, results in the escape of mucus and of blood, which pass from the uterus through the os tincæ into the vagina, and thence externally; this is popularly denominated menstruation. I have just said that, as a general principle, the ripening of the ovules—ovulation—is accompanied by a muco-sanguineous discharge; but you must bear in recollection that this muco-sanguineous discharge is not uniformly present; the want of this distinction has, I think, given rise to more or less embarrassment. Menstruation does not, be it remembered, essentially consist in the monthly evacuation, which usually occurs,* but in the cardinal physiological fact—that *one or more ovules reach their maturity every month*. With the appreciation, therefore, of this important truth, you can readily comprehend how, under certain circumstances, a female may become impregnated who, in the ordinary acceptation of the term, has never menstruated, examples of which we shall cite, when treating of gestation.†

* It is undoubtedly true that, at each catamenial period, there is usually a sanguineous discharge from the vagina; but this discharge, so far from representing the essence of the menstrual function, is simply one of the ordinary links in the chain of phenomena which occur at this time. The periodical ovarian nixus is necessarily accompanied with more or less congestion of the uterine organs, and the passage of the blood into the world is nothing more than an effort of nature to relieve the vessels from their hyperæmic condition. If, however, as will sometimes occur, this discharge of blood should not take place, numerous nervous disturbances may result from one of two causes—either from the sojourn in the general system of the noxious elements contained in the menstrual fluid, or from the irritation of the ovarian and uterine nerves in consequence of the continued engorged condition of the unrelieved vessels.

† Dr. Szukiss, of Vienna, during a period of fourteen years, and in 8000 cases, met with fourteen instances of total absence of menstruation. In four of these instances, the women had borne several children; the other ten were barren; most of these, however, experienced, every three or four weeks, the ordinary symptoms, or *metimina menstruationis*. In none was there any vicarious menstruation; but in two, imperfect development of the uterus was discovered.

Le Cat has been the object of much ridicule for having originated the theory that menstruation is the result of a voluptuous congestion of the uterine organs; but if, in his ignorance of what is now known in reference to ovulation, he could not more definitely explain his idea than by employing the term *voluptuous*, yet it is very evident that his mind was in the right direction on the subject.

The ovular theory of menstruation, which has recently received much attention, and been the subject of special research, was well understood and described by a clever and logical writer as early as 1821—I mean Dr. John Power. Indeed, I think he is entitled to the credit of having accurately delineated the ovular phenomena. In order that you may appreciate the basis for this statement, I quote from him the following passage: “The generative powers of the human female are not limited to the production of a single ovum; on the contrary, a number may always be detected in the ovaria, under different states of progress. The loss or disappointment of one matured ovum is followed by the maturation of another; this, in its turn, becomes disappointed, and thus an indefinite series is carried on throughout the period of generative capacity.”* I do not wish to be understood that this interesting subject had not been alluded to by writers prior to the time of Dr. Power; but, in my judgment, to him is due the credit of having embodied in a clear digest what may, with some reason, be denominated the fragmentary notions advanced on the subject by his predecessors; and I think, too, that he has, in a measure, anticipated the investigations of those who have succeeded him in this field of inquiry.

Periodicity of Menstruation.—But why should menstruation be periodical—that is, occur once in twenty-eight days, instead of being continuous and uninterrupted like most other functions of the system? Haller inculcated the doctrine that the true explanation of the periodicity of the catamenia was, that nature required twenty-eight days to repair the loss of blood sustained at each menstrual crisis, and that it was not until this lapse of time that the vessels again became filled so that they could pour out their contents. This great man, and accurate observer, however, was in error on this question. If you examine an ovary in its congested state, you will observe on its surface the matured ovules of which I have spoken, or at least the remains of the ruptured vesicles from which they have escaped; examine the organ still more closely, and you will detect, imbedded in the subjacent tissue, other ovules, which are not matured, but which, as they approach the surface of the ovary, become so, precisely as did the first; so, in this way, there is at each monthly crisis a constant succession of ovules, one or

* *Essays on Female Economy.* London, 1821. p. 25.

more of which either become fecundated by the seminal fluid of the male, or, in the absence of such influence, escape with the catamenial fluid. This periodical maturation of the ovules continues from the period of puberty until the final cessation of menstrual function.

There is a singular coincidence as to the physiological condition of the ovary before the age of puberty, and at the time the woman ceases finally to menstruate. Previous to puberty, the ovaries, as we have already stated, are undeveloped, enjoy no action—in a word, they are inert; after the function has ceased, these same bodies fall into a state of atrophy, and are no longer engaged in the affairs of the economy. The similarity of condition in these organs, before and after the menstrual crisis, is explained in this way: menstruation is the evidence which nature affords that the female is susceptible of becoming impregnated, that she is in a state to carry out the cardinal office of her sex—the reproduction of her species. Menstruation, you have just been told, is but the result of the ripening of the ovules, which the female is required to furnish in order that she may perform her part in the great work of increase. The reason, therefore, that her ability to perform this latter duty is restricted to certain limits, is because it is only within these limits—from puberty to the final termination of the menstrual function—that the ovaries are capable of secreting ovules, which constitute the *sine quâ non* of procreation, so far as the female is concerned.*

Source and Nature of the Menstrual Fluid.—There has been much controversy, and very discrepant opinions have been advanced, regarding the source and mode of production of the menstrual fluid. It has been argued by many writers that the catamenia are simply an exudation; others, on the contrary, say they are a secretion. It appears to me that the real cause of the contradictory opinions, entertained upon this subject, is traceable to the circumstance that the preliminary question—the one absolutely essential to the proper solution of the inquiry as to the true source of the menstrual discharge—has not been sufficiently considered. The question to which I allude is this: What is the menstrual fluid? Is it really and truly blood, presenting all its elements and characteristics, or does it, in its constituents, disclose that it is not blood? Let us briefly examine this point. It has been very satisfactorily proved by Donnè† and others, that the catamenial fluid

* Several instances have been recorded in which, after the ablation of the ovaries, the menstrual function entirely ceased; but, perhaps, the most remarkable example is the case of the young woman mentioned by Pott. In this case, both ovaries had been removed by the double operation. The catamenia, although previously regular, never re-appeared.

† Donnè has subjected the menstrual fluid to a careful microscopic examination,

in the uterus, and the catamenial fluid in the vagina, present a very important difference. In the uterus it is really blood, possessing all its elements; in the vagina, on the contrary, it loses its fibrin, for the reason that this latter product is dissolved by the vaginal mucus, which contains more or less acetic acid.

You see, therefore, that the menstrual fluid, as soon as it passes into the vagina, becomes deprived, through the destruction of its fibrin, of its power of coagulability. It will, however, occasionally happen, that large coagula do pass from the vagina, and this occurs in certain forms of profuse menstruation, in which the loss is so abundant in quantity, that there is not sufficient mucus to dissolve the fibrin.

Therefore, if it be conceded that the catamenial fluid within the uterus contains *red corpuscles*—a necessary element of normal blood—it is very evident that it cannot pass from the vessels through endosmosis or percolation; it can only escape through rupture of the engorged capillaries. Have you ever witnessed a case of profuse hæmoptysis, or hæmatemesis? If so, the inquiry may have suggested itself to you: Where does this immense quantity of blood come from, or, more properly, how does it pass from the lungs and stomach? The mode in which the blood escapes, in these instances, either from the lungs or stomach, is precisely the same as in the case of the menstrual fluid. It is through rupture of the pulmonary and gastric capillary vessels. In answer, therefore, to the question, what are the source and mode of production of the menstrual fluid, it may be said that, at each catamenial crisis, the capillary vessels on the internal surface of the uterus and fallopian tubes become congested, and through their rupture afford escape to the fluid. The mucus, which is more or less commingled with the catamenial discharge, consists of an epithelial secretion from the mucous membrane of the organ.

Duration and Quantity lost at each Menstrual Period.—The duration of each menstrual period is from three to eight days—and the quantity of fluid lost at each monthly turn will vary from one to eight ounces. It is well, however, to remember that both the duration and quantity lost will depend upon various individual circumstances, so that there is no fixed rule with regard to either of these points; thus the extremes, which I have mentioned, may be normal, and in accordance with the general health. One female, for example, from some peculiar idiosyncrasy, will menstruate only for one or two days, and another for six or eight; one will lose from four to six ounces, another only one or two ounces. The im-

and presents the following as its constituents: 1st. Ordinary blood globules, with their special characteristics, in large quantity. 2nd. Mucous globules. 3rd. Epithelial or epithelial scales detached from the mucous membrane of the uterus and vagina.

portant fact, which you are to bear in recollection, is this: that the time and quantity of the menstrual discharge are always to be considered as natural, and in harmony with the demands of the economy, *unless constitutional disturbances should follow*; these latter are the only evidences that the interposition of the practitioner is necessary.

Is Menstruation Peculiar to Woman?—The doctrine has generally been maintained that menstruation is peculiar to the human female. If, by this, it be intended to convey the idea that the function, as it exhibits itself in woman, with all its phenomena, its duration, etc., is exclusively recognized in her, then I can see no objection to the doctrine, if, perhaps, we except the monkey tribe, for it is founded upon undeniable evidence.* If, on the contrary, it be argued that, during the period of *heat*, which is nothing less than a periodical aptitude for procreation, certain of the lower mammalia do not have any sanguineous discharge, no matter how slight or for how short a time, then I object to the doctrine, for it is adverse to the evidence furnished us by accurate observation. Examine, for example, the slut at the time she is about to take the dog (her period of *heat*), and you will find not only congestion of the parts, but also a slight sanguineous show; and during this season of *heat* the same phenomenon is observed, so characteristic of the menstrual function in women, viz. the spontaneous maturation and escape of ovules.†

Are there Poisonous Elements in the Menstrual Fluid?—Although, as we have stated, the menstrual fluid, while within the uterus, is essentially blood, yet there still exist differences of opinion regarding the other properties of this discharge. The ancients entertained peculiar views on this subject. It was supposed by some that it contained such concentrated poison, that its very exhalations would turn the purest milk sour, and throw a blight over the freshest and loveliest flowers of the garden. Indeed, I am not so confident that Pliny, and many of the writers among the Arabians, did not at least approach the truth when they

* It has long been known that monkeys are subject to a periodical sanguineous discharge; and some interesting details have recently been presented by M. Neubert, of Stuttgart. He has had in his possession, since 1830, forty monkeys, in which he closely observed the phenomena connected with this discharge. Menstruation was regular every four weeks, as in women, and continued three or four days; this circumstance was noticed in several different species. During the months of July and August, however, the flow was absent. The discharge occurred whether the females lived apart, or with the males; and it ceased after fecundation. As an exception, the monkeys of Australia menstruate only twice a year, and take the males only at these periods [Moniteur des Hôpitaux.]

† Some interesting details will be found on the subject of menstruation in animals in a paper by Breschet, entitled, *Recherches sur la gestation des quadrumanes*. [Mémoires de l'Académie des Sciences, t. 19.]

advanced the opinion that the catamenial discharge incorporated certain noxious elements. These writers, it must be conceded, were fanciful, and some of their illustrations supremely ridiculous; but laying these exuberances aside, I believe there is much truth in the aggregate of opinion they entertained on this subject. Most modern authors, however, are disposed to smile with something less than contempt at what they are pleased to term the "crude notions" of the early fathers respecting the properties of the menstrual blood. The smile might be pardoned, if those who indulge in it had given us something positive and well-defined touching this question, so interesting both in its physiological and pathological relations.

I have myself no experiments to offer with the view of demonstrating that the menstrual blood positively contains noxious materials, but I argue the affirmative of this question from the pathological states which are observed to follow certain abnormal conditions of the catamenial function. For instance, in one hundred unmarried women, who may labor under suppression of the menses from the operation of any of the influences known to produce this result, such as cold, mental emotion, etc., it will be discovered that, in at least ninety-five, the suppression will be followed by more or less disturbance of the nervous system. In some, it is true, the symptoms will be slight and evanescent, but in others they will assume a more marked character, sometimes even producing mania, coma, epilepsy, catalepsy, or chorea. May not these phenomena be due to a species of toxæmia, or blood-poisoning, traceable to the poison of the menstrual blood upon the nervous centres? *

This opinion seems to be confirmed by the important fact that the nervous disturbances cease with the return of the function. I have enjoyed full opportunities for observing the effects on the economy of the various forms of menstrual aberration; and I have also not failed to notice an extremely interesting and significant circumstance—a circumstance which certainly tends to corroborate the hypothesis that the derangements of the nervous system, under unnatural suppression of the menses, are owing to a species of blood-poisoning. The circumstance to which I allude is this: when the catamenial discharge, suddenly or otherwise, becomes abnormally arrested, the urinary secretion is usually diminished in proportion to the intensity of the nervous symptoms; and what is still more significant is, that the nervous perturbation will yield in proportion to the effects of diuretic and sudorific remedies. There

* These nervous derangements may also be explained by the congested state of the spinal cord, as is shown in cases of paraplegia. A very decided proof that the menstrual blood contains more or less noxious elements is demonstrated by the circumstance, that oftentimes gonorrhœa will be produced in the male if intercourse be had during the catamenial flow. This latter fact is beyond a peradventure.

is no error as to the fact—its truth is readily susceptible of demonstration.*

Critical Period.—The period at which the menstrual function finally ceases in the female may be said to vary between the ages of forty and fifty years; although it will be found that some cease to menstruate before the age of forty, while others will exceed the period of fifty years. I think we are warranted in saying that, as a general rule, the earlier the menstrual function commences, the earlier it becomes suspended, and *vice versa*. The time of final cessation has been termed, very properly, I think, the critical era of female life, for the reason that certain morbid affections are apt to develop themselves at this period. You can readily understand, for example, that various diseases of the uterus may, through the monthly disgorgement effected by menstruation, be held measurably in check, although there should be a strong predisposition to their development; but when the important climacteric arrives, and there is no longer this periodical unloading of the vessels, the elements of trouble collect, and become embodied in one or other of the affections, more or less formidable, to which the organ is liable.

Again: diseases of the mammæ are apt to exhibit themselves at this period, having up to this time been controlled by the derivative influence of the catamenial discharge. If to these facts we add the various local congestions—sometimes of the brain, sometimes of the lungs, liver, etc., and comprehend, also, in this enumeration of morbid phenomena, the various nervous perturbations, which occur at the period of final cessation, it cannot but be admitted that it is justly entitled to be denominated critical.

There is one topic to which I cannot too emphatically direct your attention, and which has a very important bearing in a practical point of view. It is extremely common for women, as the period of final cessation approaches, to be troubled with metrorrhagia; and hence it will be your duty, in such cases, to distinguish between this sanguineous discharge—which is oftentimes nothing more than one of the ordinary results of the struggle in which nature is engaged to terminate the menstrual crisis—and the discharge which is sometimes the prelude of carcinomatous disease of

* In this connexion I may remind you of the interesting fact recorded by Andral and Gavarret in their researches on pulmonary respiration; they have shown that, in the male, from the period of puberty to the age of thirty years, the consumption of carbon increases; while in the female, from the first menstruation and during the entire child bearing period, the amount of carbon consumed is always the same. It would, therefore, appear that this difference in the destruction of carbon, in the two sexes, is due to the function of menstruation, which, in this respect, at least, may be regarded as an excretion liberating the system from a noxious element. If, therefore, the function be preternaturally arrested, according to this view the economy becomes oppressed by a superabundance of carbon, and hence an infinity of pathological phenomena may ensue.

the neck of the uterus. We are, if I remember correctly, indebted to Louis and Valleix for this latter essential fact. Therefore, in all cases in which, at the turn of life, metrorrhagia may occur, I would advise you to institute a vaginal examination for the purpose of ascertaining whether or not it is connected with organic disease.

Should the female escape the dangers incident to this period of existence, she will, as a general rule, pass on, with the enjoyment of health, to a ripe old age. The spring-time of life is over, and she now lapses into the cold shades of winter. One of her great offices has been completed; she has fulfilled her destiny in the birth and tender care of her children, and she now lives still to guide them by her counsels, and rejoice in their position as useful members of society. Such, then, are the three great eras of woman's existence, each marked by its own striking peculiarities, and each, too, surrounded by more or less peril—the eras to which I allude are those of puberty, child-bearing, and the final cessation of the menstrual function.

Aptitude for Impregnation.—There is, in the human female, as in the various species of animal creation, a period in which the aptitude to become impregnated, is much greater than at others; and it will be well for you to recollect the fact, for it may occasionally enable you, by judicious advice, to consummate the happiness of the married by blessing them with offspring, after years of patient but unrequited effort on their part. You know that, at the menstrual crisis, there is on the surface of the ovary a matured ovule; this, as I have told you, either becomes deciduous matter, and passes away with the menstrual blood, or, if it should have life imparted to it by the seminal fluid of the male, it lives, becomes developed, and constitutes the future being. Indeed, the ovule, at this special period of its maturity, is not unlike the luscious peach, as it hangs in full ripeness and flavor from the parent tree—if there be no hand to pluck it in its tempting richness, it falls to the ground and decays.

Woman, then, is most apt to become fecundated at this particular time, when the ovule, in all its development, lies on the surface of the ovary; therefore, the simple suggestion, on your part, to the husband to have intercourse with his wife just before the catamenial crisis, will very likely result in impregnation. I am quite confident that I can refer to more than one instance in which I have succeeded, in this way, in adding to the happiness of parties, who for years had been honestly but vainly toiling for the accomplishment of their hopes. It is a matter of historical record, that Henry II. of France, after protracted disappointment, and almost desperate under baffled hope, consulted the celebrated Fernel as to the *modus in quo* of impregnating his Queen, Catharine de' Medici; the king was advised to cohabit with her royal highness only at the menstrual

evolution; this counsel was scrupulously observed, and the result was the birth of an heir to the crown.

In India, young girls are made to marry immediately on their first menstruation, for the reason, that the doctrine is maintained there that, at each catamenial crisis, there is an ovule ready for impregnation, and if it be not fecundated, it becomes destroyed, and, therefore, it is held that the party is guilty of child murder.* It appears that this has been the law for a very long period in India, and, as it is evidently based, in a measure, on the ovular theory of menstruation, it is quite manifest that this theory is not altogether of recent origin. You perceive, gentlemen, that, in discussing the general subject of menstruation, I have said nothing of the numerous pathological conditions to which the function is exposed; these I have treated of fully in my work on the Diseases of Women and Children.

* "It was upon an ancient theory respecting generation, very much resembling our own, that early marriages seem to have been instituted in India. It was said, that if an unmarried girl has the menstrual secretion in her father's house, he incurs a guilt equal to the destruction of the fœtus; that is, according to the doctrine of Pythagoras, and the theory of the ovarists, all the material of the new ovum, and the ovum itself, is formed by the female: menstruation was, therefore, the loss of the ovum, or loss of the fœtus." [Dr. Webb, Prof. of Military Surgery, in the College of Medicine, Calcutta.]

. LECTURE VIII.

Reproduction—Its Importance and Necessity—Early Opinions concerning—Meaning of the term Fecundation ; in what it consists—Reproduction the Joint Act of both Sexes—The Female furnishes the "Germ-cell"—The Ovisac or Graafian Vesicle—*Membrana Granulosa*—*Discus Proligerus*—*Zona Pellucida*—Germinal Vesicle—Germinal Spot—Modifications in the Ovisac previous to its Rupture—*Corpus Luteum*—"Coagulum" does not contribute to its Formation—*Corpus Luteum* not a Permanent Structure—True and False *Corpora Lutea*—Former connected with Pregnancy, Latter with Menstruation—Characteristics of each—True *Corpus Luteum* an Evidence of Gestation, but not of Childbirth—Can two "Germ-cells" be contained in one Ovisac?—The Male Vivifies the "Germ-cell"—Spermatozoon, the True Fertilizing Element—What are the Spermatozoa?—Contact between "Sperm-cell" and "Germ-cell" necessary for Fecundation—How accomplished—Opinions concerning—*Aura Seminalis*—Electrical and Magnetic Influence—Doctrine of the Animalculists—Chemical Hypothesis—Mr. Newport's Experiments on the Frog—Deductions—Where does this Contact take Place?—Experiments of Bischoff and Valentin—Theory of Pouchet—Movements of Spermatozoa—Deductions from Analogy—Experiments of Nuck and Haighton—Fimbriated Extremity of Fallopian Tubes—Peculiarities of.

GENTLEMEN—The subject next in order for our consideration is one which cannot fail to interest you, for it involves the important question—the origin and reproduction of the human species. To treat, therefore, of our own individual origin, and the mode by which the human family is propagated, is, it cannot be denied, to discuss a topic at once full of interest, and not altogether free from mystery. It would be somewhat out of place in lectures intended, as far as I can make them so, to be essentially practical, to speak of generation except so far as it relates to the production and development of the human fœtus. It may, however, be observed, that organized beings can be perpetuated only through reproduction. Let the earth be covered, the waters filled, and the universal globe crowded with living beings, and yet how soon would life become extinct, and the world a blank, were it not for the constant generation of new beings to take the place of those who have run their race, and yielded to the inexorable demands of time. Look at the bills of mortality ; see what myriads of the human family are swept from earth every year by disease, and the natural decay of the system—and the same argument applies to all animated creation—and then tell me whether this prodigious waste does not require a corresponding supply. It is with all living things, as it is with the

existence of governments and nations; both are to be perpetuated through the law of succession. Were it not for this great fact, how rapid and final would be the victory of death!

The subject of reproduction has occupied the attention of man from the very earliest periods of his history; and you will find that, in the remotest times of our science, hypothesis followed hypothesis in the earnest attempt to elucidate this profound and vexed problem. If we are sometimes amused at the novel and singular views advanced by the early fathers in their explanation of this fundamental vital act, it must be remembered that their theories and reasoning were the theories and reasoning of those, who had nothing to guide them but their own observation; they were lost, as it were, in the darkness of the night; they were without the torch-lights, which the progress of science has furnished to the men of modern times, through the developments of physiology, pathology, and chemistry. While, therefore, I honor the philosophers of the present and proximate ages, for their rich contributions of science, and bid them God-speed in their profound researches, yet I cannot but look back upon the early apostles of our profession with feelings of filial reverence. As pioneers, they have accomplished much; as accurate observers, they have given us many substantial principles.

Reproduction—Meaning of the Term.—Reproduction, in its strict physiological meaning, implies the development of a being, so that it may be capable of an external or independent existence; hence, it consists of a series of processes, which, when completed, constitute the entire reproductive act. The first of these processes, in the human species, is the contact of the two sexes, known as copulation. The second process is fecundation, which consists in the exercise of a vitalizing influence, through the male, on the germ furnished by the female. This act of vitalization, or imparting life, gives rise to another process, conception. In strict physiological truth, it may be said the male fecundates, and the female conceives. Then follows gestation, during which the embryo grows and becomes developed; and when its development has been sufficiently accomplished, labor occurs, the object of which is to expel it from the uterus. As soon as this is effected, the entire relations of the new being are changed. It breathes, and, therefore, has a circulation of its own. It is no longer dependent upon its parent for the elaboration of its blood; its lungs, which, before birth, were without function, commence at once their round of duty; the first gasp of the infant may be considered its declaration of independence.

Its organic existence is now called into action; it receives food, which, through the operation of its digestion, is converted into chyle; this latter passes through the thoracic duct into the venous

system, whence, by the ascending and descending venæ cavæ, it is conveyed to the right cavities of the heart, and thence to the lungs, where, through the elaborative action of these organs, it becomes decarbonized, or, if you choose, arterialized; it then is taken to the left cavities, and distributed, through the ramifications of the aorta, to all portions of the system, imparting nutrition and development to every tissue.

It is a physiological truth, that reproduction is the joint act of the two sexes, and it now remains for me to show you what science has disclosed as to the respective parts assumed, in this wonderful scheme, by the male and female. It would not be profitable to array before you the numerous and conflicting theories, which have been maintained with more or less zeal on this subject; I prefer rather to present to you what I believe, at the present day, to be the accepted and recognised facts touching this interesting topic.

The Germ-cell.—The female, in the act of reproduction, furnishes the ovule, or “germ-cell,” which, as you have already been informed, is a product of the ovary. This ovule has no inherent power of development beyond its mere growth as an ovule; and, as I have remarked to you, after it has reached its maturity, if it be not vitalized by the male, it perishes and passes off with the menstrual blood. The human ovum, like that in all vertebrated animals, is contained within a sac, which, externally, is in apposition with the substance or stroma of the ovary; this sac, through courtesy to its discoverer is known, in mammals, as the Graaffian vesicle or ovisac. Its internal surface is supplied with a number of nucleated epithelial cells, constituting the membrana granulosa; these cells likewise furnish a disk-like covering to the ovum—the discus proligerous. The Graaffian vesicle contains a quantity of fluid, and, in its centre, is observed the ovule. This latter, in the human subject, is extremely small, measuring not more than $\frac{1}{128}$ th of an inch in diameter, and sometimes much less; it has an external membrane, which, from its transparent character, is called the zona pellucida, inclosing the yolk or vitellus, the object of which is to furnish nourishment to the germ during the earlier stages of its development. In the centre of the vitellus is the germinal vesicle, which is regarded as the essential portion of the ovum; the nucleus of the germinal vesicle is denominated the germinal spot. Although the ovum is at first in the centre of the Graaffian vesicle, yet, in proportion as the contents of the vesicle approach maturity, the tendency of the ovum is to move toward the circumference of the ovisac, so that, just prior to its extrusion, it is quite near the surface of the ovary; the advance of the ovum toward the outer portion of the ovary is one of the ordinary processes preparatory to its fecundation, and is supposed by Valentin to be due to the fact that, as the ovule progresses in development, there is effused in the

lower portion of the ovisac a fluid, which presses the discus proligerus before it against the opposite wall.

The Graaffian vesicle or ovisac, is said to be composed of two envelopes or layers, and it is proper that you should have a clear appreciation of its structure. In reality, the ovisac presents but a single vascular tunic formed of laminous cells, and of those *so-called cells of the ovisac*, irregular and grainy. This tunic is covered by a nucleated epithelium, and is immediately surrounded by the stroma of the ovary. You have been told that the ovule, when it has attained its maturity, escapes through rupture of the ovisac. But, previous to this rupture, it is interesting to note the changes which occur in the ovisac itself; for example, there is a general increase in its vascularity and an appearance of fatty cells, with an increased development of those of the ovisac, exhibiting a yellowish color, intended for the production of the corpus luteum, which is regarded by some physiologists as a mere hypertrophy of the membrana granulosa, or internal coat of the ovisac. When the ovum escapes from the ovisac, the internal surface of the latter presents at first a sort of irregular cavity, from the fact that its epithelial lining is thrown into folds or wrinkles, the direct result of the contraction of the ovisac; this cavity, however, soon begins to lessen in consequence, in the first place, of the increased development of the granular cells; and, secondly, from the contraction of the ovisac itself. Ultimately, the cavity is almost entirely obliterated, and is represented by what has been described as the stellate cicatrix. When the rupture of the ovisac is accomplished, there is an effusion of blood in the remaining cavity, forming, of course, a coagulum; this sometimes becomes deprived of its coloring matter, and is absorbed, assuming the attributes of a fibrinous clot; at other times, the fibrine is absorbed at once, the red corpuscles become grainy, and disappear slowly; the clot maintaining its reddish color which is due to the hematoidine.

The Corpus Luteum of Pregnancy and of Menstruation.—The corpus luteum was at one time supposed, when recognised on the ovary, to be a positive indication of previous gestation, and the number of these bodies represented the precise number of children borne by the parent. This opinion, however, recent researches have shown to be fallacious. In the first place, the error was no doubt, in part, owing to the circumstance that the corpus luteum was regarded as a permanent structure; and, secondly, that its color was looked upon as its exclusive characteristic. It has been very satisfactorily demonstrated that neither of these assumptions is correct, for small yellow spots may exist on the ovary independently of impregnation; while the corpus luteum itself, which is the direct result of gestation, disappears after a certain period, and, therefore, is not permanent. You must also bear in mind, that whenever there is a

rupture of the Graafian vesicle, no matter from what cause, there will necessarily be, as the product of that rupture, a corpus luteum.

You have been reminded that, as a general rule, there is an escape of the ovule at each menstrual crisis; hence, there are two classes of corpora lutea, one the result of menstruation, the other of impregnation; and, therefore, the division of these bodies into false and true—the former representing the corpus luteum of menstruation, the latter that of gestation. This is an important distinction for the reason that, in more than one instance, the previous existence of pregnancy has been attempted to be proved by the recognition, in a post-mortem examination, of these bodies on the ovary, their mere presence constituting the only basis for such an opinion. It must, therefore, be manifest, how essential it is to have a just idea of the characteristics of the true corpus luteum, and understand in what way it is to be distinguished from the one which is simply the offspring of menstruation.

I need not tell you that upon this—as on many other questions of science—there is a difference of sentiment among writers, but I believe there is a sufficient concurrence, as to the general points of distinction, to afford reliable data for opinion.* Prof. J. C. Dalton, in an elaborate paper, gives the following summary as the result of his investigations on this subject: “The corpus luteum of pregnancy arrives more slowly at its maximum development, and afterward remains for a long time as a noticeable tumor, instead of undergoing rapid atrophy. It retains a globular or only slightly flattened form, and gives to the touch a sense of resistance and solidity. It has a more advanced organization than the other kind, and its convoluted wall is much thicker. Its color is not of so decided a yellow, but of a more dusky hue, and if the period of pregnancy is at all advanced, it is not found, like the other, in company with unruptured vesicles in active process of development.”†

It is now, I believe, generally conceded that the corpus luteum, unconnected with pregnancy, and simply the product of menstua-

* After a careful review of the subject, the following conclusions have been deduced as being most likely to enable the observer to arrive at a just opinion: 1. A corpus luteum, in its earliest stage (that is, a large vesicle filled with coagulated blood, having a ruptured orifice, and a thin layer of yellow matter in its walls), affords no proof of impregnation having taken place; 2. From the presence of a corpus luteum, the opening of which is closed, and the cavity reduced or obliterated, only a stellate cicatrix remaining, also no conclusion as to pregnancy having existed, or fecundation having occurred, can be drawn, if the corpus luteum be of small size, not containing as much yellow substance as would form a mass the size of a small pea; 3. A similar corpus luteum, of larger size than a common pea, would be strong presumptive evidence, not only of impregnation having taken place, but of pregnancy having existed during several weeks at least: and the evidence would approximate more and more to complete proof, in proportion as the size of the corpus luteum was greater.” [Baly's Supplement to Müller's Physiology, page 57.]

† Transactions of the American Med. Association for 1851.

tion, is seldom of greater volume than a small pea, while, usually, it is even less than this; from six to eight weeks it undergoes such rapid and positive diminution as to represent only a very small point on the surface of the ovary; hence this latter will ordinarily exhibit false corpora lutea, in greater or less number, in women who have their menstrual periods with regularity.

The corpus luteum of pregnancy is characterized by great vascularity, and this, no doubt, is explained by the fact that, at the time of fecundation, the uterine organs become the centre of an extraordinary afflux of blood, far greater than during an ordinary menstrual crisis. The size, too, of this corpus luteum is worthy of attention, as constituting a broad distinction between it and the one which is merely the result of menstruation. As a general rule, it will occupy from one-fourth to one-half the surface of the ovary, depending upon the particular period of gestation at which it may be inspected. It is usually larger during the earlier months, say till the third to the fourth; its volume, however, will vary, occasionally, even at given periods of gestation, in different individuals. As the completion of pregnancy approaches, the corpus luteum begins to decline in size, and undergoes a very marked alteration—its vascularity rapidly diminishes, and its color becomes much lighter; after parturition, whether at the full term, or as the consequence of premature action of the uterus, this body begins to fall into a state of atrophy, and so completely loses its characteristics as to render its recognition next to impossible. It is admitted that two or three months after delivery it completely disappears from the ovary; and it is now well agreed that a corpus luteum of a previous conception (provided the gestation arrive at the full term) is never found to coexist with that of a subsequent fecundation. After the disappearance of the corpus luteum, its original site is usually noted by a small cicatrix, or line; and it is important to recollect that these cicatrices, like the corpora lutea themselves, are not permanent, but become, in the progress of time, more or less effaced.

An exceedingly interesting question now arises in reference to the presence of the true corpus luteum on the ovary, and it is well worthy of a moment's thought. Is this corpus luteum always an evidence of previous childbirth, or is it only an evidence of previous impregnation? That it is not an invariable proof that the female has borne a child, is demonstrated by the fact that there are well-authenticated instances in which the corpus luteum of gestation has been recognised without previous parturition; but, on a critical investigation, it has been shewn, in all these instances, that abortion had occurred; so that the existence of the corpus luteum, although not an evidence of childbirth, must be regarded as a proof that fecundation had taken place. A multitude of influences may operate to destroy the germ, after it has been fecundated, and cause it

to undergo such marked degeneration as to prevent its recognition. Therefore, it may be, in such instances, that the presence of the corpus luteum will afford the only evidence of the conception. Again: Is it possible for a woman to bring forth twins, and have only one corpus luteum? The reply to this question is, that there are recorded examples of two ovules being contained in one ovisac, and, consequently, in such case, there would be but one corpus luteum.* It is quite remarkable that those clever observers, Todd and Bowman, in their late work on physiological anatomy, should hold the following language, which is certainly in direct conflict with well-observed facts: "In cases of twins, two corpora lutea are always present."† As regards the existence of the true corpus luteum, and what it proves, it may, I think, be safely affirmed that the researches of modern science have demonstrated the truth of the aphorism long since put forth by that accurate observer, Haller—"Nullus unquam conceptus est absque corpore luteo."

The Sperm-cell.—While, as it has been stated, it is the office of the female to provide the ovule, it is the province of the male to impart to it life, so that it may attain, through successive development, its fœtal maturity. But what is this vitalizing element? The testes are, to the male, what the ovaries are to the female. They are glands which constitute the essential organs of generation—they secrete, after the period of puberty, a seminal fluid which, according to the experiments of Prevost and Dumas, consists of elements obtained from three sources: 1. The fluid which comes directly from the testicles; 2. The fluid which is secreted by the prostate gland; and, 3. That which is derived from the vesiculæ seminales. The two latter elements are, as it were, but mere vehicles for the seminal fluid of the testicles. This latter contains spermatozoa, which constitute the real fecundating element; they are small filamentous bodies, which enjoy the power of spontaneous motion, and hence they are regarded by some clever writers as veritable animalcula. It seems, however, to be shown that they are not animalcula, but partake of the character of the reproductive portions of plants, which also possess a spontaneous movement as soon as they have been thrown from the parent mass; and it is likewise conceded that the ciliated epithelia of mucous membrane will continue for some time in movement after their separation from the body. Among those who maintain that the spermatozoa partake of the character of animalcula may be mentioned Monro, Haller, Spallanzani, Valentin, Pouchet, and others; while Coste, Charles Robin, and other observers believe the contrary.

In man there are developed within the tubuli of the testicles

* An interesting example of this kind is cited by Dr. Montgomery, in the second edition of his work, p. 375.

† Page 851.

what are known as the spermatie cells, within each of which is a vesicle of evolution,* as it has been termed, and in each vesicle there is a spermatozoon. It is quite obvious that the spermatozoon, the duty of which is so important, cannot boast of much magnitude—in the human being it consists of a small, oval-shaped body, measuring, in length, from $\frac{1}{800}$ th to $\frac{1}{400}$ th of a line; its tail, terminating in a very delicate point, is from $\frac{1}{200}$ th to $\frac{1}{100}$ th of a line. Its power of movement, it appears, is chiefly through the undulations of the tail. M. Godard† has recently discovered in man a new species of spermatozoon, with a very small head, and the tail is endowed with much more rapid and durable movements than the tail of the common and well-known spermatozoon. The essential fact to be recollected is, that the spermatozoon represents the true fertilizing element, and possesses the exclusive power of imparting life to the ovule of the female. It has been shown by Donné that the spermatozoa are deprived of all power of motion under peculiar conditions of the vaginal and uterine secretions—for instance, when there is a morbid acidity of the vaginal mucus, or an excessive alkaline secretion from the uterus. This inability to move is, of course, tantamount to the destruction of the fecundating attribute now so generally ceded to the spermatozoon. Therefore, the practical fact is to be deduced that these morbid secretions of the uterus and vagina may sometimes, through their influence on the spermatozoa, be the cause of sterility. Wagner has not found spermatozoa in the mule; and it is well known that most hybrids do not produce offspring. Indeed, it was formerly supposed that all hybrids failed in the fecundating power. It has very lately been shown, however, that there are some exceptions to this rule.‡

Theories of Fecundation.—It is curious to note the various and discordant theories, which have been advanced from time to time in explanation of the true *modus in quo* of fecundation. For example, it was once imagined that there passed from the seminal fluid of the male a vapor—an aura seminalis—and that it was through the agency of this latter that life was imparted to the ovule; and, again, it was maintained that the fluid, after being deposited in the vagina, was absorbed, and reached the ovule through the circulation. Electrical and magnetic influences have also been invoked to demonstrate the profound problem of vivification. The animalculists, too, contended that each drop of the male sperm contained myriads of living germs already formed, and that, during coition, they are thrown into the uterus, and all of

* While in man there is but one vesicle of evolution in each spermatie cell, in animals there are several.

† Etudes sur la Monorchidie, etc. 1857. pp. 73, 74.

‡ Mémoire sur l'Hybridité en general, etc. By PAUL BROCA. Journal de la Physiologie de l'Homme et des Animaux. p. 433.

them, with the exception of one, die; the one which is fortunate enough to escape destruction passes through the fallopian tubes to the ovary, and penetrates a small vesicle which has been prepared for its reception—it then is brought back through the tube to the uterus, where it remains until its full development has been completed.

This doctrine of the animalculists is indeed fearful for the contemplation of the philanthropist—it implies a slaughter of human beings unexampled in the pages of history. There is nothing in the carnage of the battle-fields of ancient or modern warfare, which can approach this melancholy sacrifice of human life. With this hypothesis, the reproduction of one's species is no trifling matter—conscience, in my opinion, must become veritably seared before engaging in any such enterprise!

On the supposition that the spermatic fluid, like the blood, is chemically so constituted that constant motion is absolutely necessary for the maintenance of its fecundating properties, Valentin, Bischoff, and others, have advanced the hypothesis that the only object of the spermatozoa is, through their active movements, to preserve the chemical composition of the fecundating liquor.

Carpenter, and other physiologists, are of opinion that Mr. Newport's* recent observations render it very probable that the contact between the ovule and spermatozoon causes the latter to undergo solution; and that the essential act of fecundation consists in the passing of the product of this solution into the interior of the ovule, thus blending, as in plants, the contents of the "sperm-cell" with those of the "germ-cell." Indeed, it seems now conceded by the very best observers, that it is not simply contact between the "germ-cell" and "sperm-cell," but that actual penetration takes place at the time of fecundation. Among others, in confirmation of this view, I may cite the names of Martin Barry, Meissner, Kohen, and even Bischoff, who for a long time had doubted the fact—all these have absolutely seen the spermatozoa penetrating the ovum.

Seat of Contact between the Germ and Sperm Cells.—In what particular portion of the uterine organs does this contact between the "sperm-cell" and "germ-cell" take place? Is it in the uterus, fallopian tube, or ovary? There has existed, and there still continues to exist, much difference of opinion upon this subject. The early fathers maintained that the uterus itself was the seat of this

* In his experiments testing the mode of impregnation in the frog, Mr. Newport has shown that the spermatozoa become imbedded in the gelatinous envelope of the ovule in a few seconds after contact has been accomplished; thence they penetrate the vitelline membrane, and pass to the interior of the ovule. These experiments of Mr. Newport have been fully confirmed by Bischoff.—[Philos. Transac. 1853 pp. 226, 281.]

contact—and, no matter how discrepant their theories regarding other points touching the question of reproduction, yet there appears to have been a very general assent to the fact—that the uterus constituted the special seat in which vivification was accomplished. At the present day, however, some of the cleverest physiologists believe that the “germ-cell” is vivified by the “sperm-cell” very generally in the ovary; and this opinion, it seems to me, is founded upon acceptable, if not irresistible, evidence. Bischoff, Coste, Wagner, Barry, Valentin, and others, have positively recognised spermatozoa on the ovary of animals killed soon after copulation. The following passage from Bischoff is to the point: “I had frequently observed spermatozoa in motion in the vagina, womb, and fallopian tubes of bitches; but, on the 22d of June, 1858, it was my good luck to perceive one on the ovary itself of a young bitch in heat for the first time; she was covered on the 21st, at seven o'clock, P.M., and again on the following afternoon at two o'clock; at the expiration of half an hour, that is, twenty hours after the first copulation, I killed her, and found several living spermatozoa, endowed with very active motion, not only in the vagina, uterus, and tubes, but even amid the fringes of the latter, in the peritoneal pouch which surrounds the ovary, and on the surface of the ovary itself.” Valentin speaks as follows: “On opening the body of a female mammal, one or more days after it has received the male, semen may be found, not only in the body and horns of the uterus, but also in the oviducts, and on the surface of the ovary.”

Here, then, we have more than mere hypothesis; we have positive affirmation; and this same character of testimony could be much increased by other observers, but I do not deem it necessary to make further quotations. If, together with the essential fact that living spermatozoa have been seen, soon after copulation, on the surface of the ovary, it be recollected that the existence of ovarian and ventral pregnancy has been satisfactorily demonstrated, it does appear to me that it follows, almost as a necessary consequence, that the seat of contact between the two germs is in the ovary. Nature rarely runs vagrant; while she is abundant in her provisions for the wants of the system, yet she always exercises a wholesome jurisdiction; superfluity is not one of her faults; on the contrary, in all her operations she is characterized by a prudent and conservative economy. Why, then, should living spermatozoa be found on the ovary, soon after coition, if it be not in accordance with nature's design? Will it be said that this is a mere coincidence, an exception to the general rule, as Pouchet has endeavored to show? This latter writer, I think, has signally failed in his theory upon the subject. He advances as an argument why the ovary cannot be the point of contact between the germs, that the

peristaltic movement of the fallopian tube is from within outward, and that, on this account, it cannot convey the semen of the male from the womb to the ovary. It does not appear to me that there is much force in this reasoning, so far as the question at issue is concerned, for, admitting the truth of the direction of the peristaltic movement of the tube, it does not, in my judgment, in any way invalidate the opinion that the fertilizing element of the semen reaches the ovary, and there vivifies the "germ-cell." You have been told that the spermatozoa enjoy a power of movement, and it is now ascertained that their progress is equal to one inch in thirteen minutes. I believe, therefore, that they find their way to the ovary in virtue of their own movement; as soon as they are thrown from the male into the vagina they commence their journey.

The experiments of Nuck and Haighton are quite conclusive as to the ovary being the seat of contact between the germs. You will remember that, in placing a ligature, soon after copulation, around the fallopian tube, and some time afterward killing the animal, Nuck found that fecundation had occurred, and that the development of the ovum was going on in the ovarian extremity of the tube. Haighton, on tying the tube in rabbits, ascertained that fecundation did not take place on that side in which the ligature had been applied. Indeed, the most recent observers seem generally to agree that the ovary is the place of meeting of the two germs. Montgomery says, "After the best consideration I could give to it, it is the conclusion arrived at in my mind." In connexion with this point, it may be stated that Coste has recently started a new theory in explanation of why the ovary must necessarily be the place of union between the sperm and germ cells. He says, the ovule, as soon as it passes from the Graaffian vesicle, undergoes alterations, which render it totally unfit for fecundation. In conclusion, I think it may be affirmed, without denying the occasional meeting of the germs in the uterus and fallopian tubes, that the union is most generally accomplished in the ovary.

How does the Fecundated Ovule find Admission into the Fallopian Tube?—This question has generated numerous hypotheses; but none of them are without objection. It has generally been supposed that the fimbriated extremity of the tube is made to grasp the surface of the ovary, through the contraction of its muscular fibres; it is very evident, however, as Rouget has remarked, that it is the action of the longitudinal fibres only which could in any way affect the position of the free extremity of the tube; but the immediate result of the contraction of these fibres would be a diminution in the length of the tube; consequently, instead of approximating its extremity to the ovary, the necessary tendency would be to place it more remote from that body. Ha,

therefore, repudiates this explanation, and refers the contact of the fimbriated extremity of the tube with the ovary, at the time of ovulation, to the combined contraction of what he terms the ovarian-tubal muscular fasciculi. It is a veritable spasmodic contraction of this muscular apparatus, which consummates the contact.

But the question arises as to the special influence, which originates this muscular contraction, or, in other words, what is it that throws these fibres into action? When the Graaffian vesicle has attained its development, and is matured, the distension of the muscular fibres proper to the stroma of the ovary begets a reflex movement, which is immediately transmitted to the tubo-ovarian muscular system. This latter contracts, and this brings the extremity of the tube in close contact with the ovary. The ovule is detached, and then conveyed through the vermicular movement of the tube itself to the uterus, where it remains sufficiently developed to prepare it for an independent or external existence. Precisely the same thing takes place in menstruation; so that whether the ovule be fecundated or not, it drops, as it were, from the ovary, and is received into the tube to be conveyed in the latter case to the uterus, and pass off as a deciduous body with the catamenial discharge. The approximation of the tube to the ovary, at the menstrual period, is explained upon the same principle as when fecundation occurs.*

I have now, gentlemen, given you, very briefly, what may, I think, be considered the accepted facts of science touching this interesting question of reproduction in the human species. In the discussion of the subject, I might have entered into many important details, elucidating propagation in the vegetable and animal kingdoms; but, as I have already remarked, such details would not be in keeping with the practical tendency of these lectures.

* In certain cases of local peritonitis, it will sometimes happen that, as the result of the inflammation, there will be an adhesion of the fimbriated extremity of the tube so remote from the ovary as to prevent contact at the time of ovulation. This, of course, would result in sterility, or in extra-uterine foetation.

LECTURE IX.

Pregnancy ; Definition and Divisions of—Is Pregnancy a Pathological Condition?—

The Uterus and Annexæ before and after Fecundation—Two Orders of Phenomena following Impregnation ; Physiological and Mechanical—How the Uterus Enlarges—Microscope and its Proofs—Development of the Muscular Tissue of the Uterus ; how accomplished—Solid Bulk of Uterus at Full Term—Meckel's Estimate—Increase of Blood-vessels, Lymphatics, Nerves, and other Tissues of Uterus—Nausea and Vomiting ; how produced—Influence of Nausea and Vomiting on Healthy Gestation ; the Explanation of this Influence—Blood—how Modified by Pregnancy—Is Plethora characteristic of Gestation?—Cause of this Hypothesis—Treatment of Acute Diseases in Pregnancy—Aphorism of Hippocrates on this Question—Increase of Fibrin in Inflammation—Deductions—"Buffy Coat" not always the Product of Inflammatory Action—"Buffy Coat" in Chlorosis, Pregnancy, etc.—Kiestine ; what its Presence indicates—Blot's Experiments—Sugar in the Urine of the Puerperal Woman—Deductions—How are we to know that Pregnancy exists? Importance of the Question ; its Medico-legal bearings ; Illustration—The Proof of Pregnancy altogether a Question of Evidence ; how this Evidence should be examined.

GENTLEMEN—We shall speak to-day of the important subject of pregnancy ; in all its bearings it is full of interest, and whether in its normal, pathological, or legal relations, claims the profound thought of the practitioner. Pregnancy may be defined to be that condition of the female, which exists from the moment of fecundation until the exit of the child from the maternal organs. It is divided into *true*, *false*, *uterine*, *extra-uterine*, and *interstitial*. In true pregnancy, there is really a fœtus ; in false, the enlargement is dependent upon something other than a fœtus ; when the product of conception is situated within the uterus, the gestation is called uterine ; when, on the contrary, the fœtus is lodged externally to this organ, it is known as extra-uterine, of which there are three varieties, viz. abdominal, fallopian or tubal, and ovarian. In the first of these varieties, the embryo, under a rule of exception, does not reach the uterus, and becomes developed in some portion of the abdominal cavity ; in the second, in the fallopian tube ; and in the third, it receives its growth in the ovary. We shall hereafter have occasion to describe more particularly each of these varieties.

There is another form of gestation in which, strictly speaking, the fœtus is developed neither *within* nor *without* the uterine cavity ; and you may well ask—How is this ? It is called *interstitial* pregnancy, for the reason that the fœtus does not rest under

either the peritoneal or mucons coverings of the uterus, but is found amid the meshes of muscular fibres of the organ, and hence the propriety of its name—*interstitial*. There have been many attempted explanations of the manner in which the fecundated ovum finds its way into this intermediate structure, but none of them are satisfactory, for they do not seem to be founded on correct data.* The cardinal fact, however, that interstitial pregnancy does sometimes exist, cannot be denied, for it has been recognised by several trustworthy observers.

In addition to the varieties already enumerated, pregnancy is divided into *simple*, *compound*, and *complicated*. In the first, there is but one fœtus; in the second, there are two or more; while in the third variety, besides a fœtus, the gestation may be complicated with an abnormal growth, such as a polypus, fibrous tumor, or ovarian enlargement.

Pregnancy not a Pathological Condition.—There has been a difference of opinion as to the true nature of pregnancy, so far as the general laws of the economy are concerned; and conflicting views have been advanced as to whether it is or is not a pathological condition. There can be no doubt that the general system, as the direct consequence of impregnation, undergoes numerous modifications; and it is entitled to consideration whether, as a general rule, these modifications should be regarded as evidences of morbid action, or whether, on the contrary, they should not be accepted as testimony that nature is engaged in the attainment of an object, which she cannot accomplish except through the operation of certain changes, which, although not morbid, will necessarily encroach more or less on that integrity of function, or, if you prefer it, equilibrium of forces, which, in the unimpregnated female, is looked upon as the standard of health. It does seem to me that this question has been somewhat misapprehended by certain writers, and they have mistaken natural processes for pathological phenomena; they have regarded the workings of nature, under peculiar circumstances, as the manifestations of morbid influence; and hence, in their judgment, the important and interesting period of gestation is a period of diseased action. Even without invoking the aids of science, common sense, it seems to me, runs directly counter to such an hypothesis.

The destiny of woman would, indeed, be one of bitter anguish, if, in addition to her other sorrows, it were decreed that, while engaged in the great act of the reproduction of her species, she

* One author, Breschet, says, that if any obstacle should oppose the ovum in its entrance into the uterus, it might glide into some one of the venous sinuses, which, he maintains, are found to open at the origin of the fallopian tubes. The existence of these sinuses has never been demonstrated, and it is now admitted that this eminent anatomist was in error.

should necessarily be subject to the inconveniences and perils of disease. So far, then, from regarding gestation as a pathological state, we maintain that, as a general principle, it is entitled to be denominated *a period of increased health*. I am speaking now of the general rule, and not of the exceptions, to which we shall hereafter have occasion to direct your attention. Indeed, some of the very best observers have declared—and the fact is well established by statistical data—that the probability of prolonged life is increased as soon as pregnancy occurs. Let us now take the converse of this proposition, and you will see, in its results, an additional proof that gestation is not in truth a diseased condition; look, for example, at those females who, either from choice or necessity, lead a life of celibacy, and see how much greater is the record of their mortality. Marriage* and pregnancy, therefore—however true religion and an earnest love for God may fill the cloister by devoted and self-sacrificing ladies—should be regarded as among the covenants of nature, and the demonstration is found in the fact of the better health and greater longevity of those who keep these covenants inviolate.

Pregnancy, although not a condition of disease, is one of excitement, in which the entire economy more or less participates; and to show you how emphatically and promptly the system responds

* It is worthy of remark that marriage is conducive to health and longevity, with certain qualifications. Some interesting facts have recently been presented by Dr. William Farr upon this subject, based upon statistics derived from the population of France; these statistics receive additional importance from the circumstance that the returns extend over the whole of France, and include all grades of its population. According to the census of 1851, with a view of showing the influence of the conjugal relation, the population is divided into three classes:

1. The married: 6,986,223 husbands; 6,948,823 wives = 13,935,046 married persons.

2. The celibates, or those who have never married: bachelors, 4,014,105; spinsters, 4,449,944 = 8,464,049.

3. The widowed: widowers, 835,509; widows, 1,687,583 = 2,523,092.

It appears that, in France, marriage is legal for males at 18, for females at 15; and it is shown that the mortality among the married women under 20 years was double that among the unmarried; while the mortality among the married men at this youthful age was greatly in excess of that of the unmarried. The rate of deaths in the married women was 14.0 in 1000, and among the maidens it was only 8.0. In the married men it was 29.0 in 1000; in the unmarried 7.0. These facts carry with them their own comment, and should serve to admonish parents against the early marriage of their children, before the physical system is sufficiently developed to sustain the requirements of that state. From the ages of 25 to 30, the mortality of the unmarried is slightly in excess, being 9.2 to 9.0. From 30 to 40 the deaths among the wives were 9.1, and among spinsters, 10.3. After 40 years of age, the rate of mortality is still more in favor of the married in women, being, from 40 to 50, 10.0, while in the unmarried it is 13.8. From 50 to 60, married, 16.3; unmarried, 23.5; and above 60, married, 35.4; unmarried, 49.8.

It would seem, therefore, that, all things being equal, matrimony tends to the promotion of health and longevity.

to the changes induced by impregnation, it may be mentioned that oftentimes, with the quickness of thought, constitutional sympathies, more or less marked, supervene on the act of fecundation; it is only necessary to understand why this is so, in order that you may appreciate, and, at the same time, see in these sympathies an evidence, not of a pathological state, but an evidence that a new link has been added to the chain of phenomena which nature recognises as rightly belonging to her.

It is interesting to note the considerate kindness with which the pregnant female was treated in ancient times. Indeed, she became the object of special attention and regard. Among the Jews she was, during the period of her gestation, permitted to partake of whatever meats she desired, no matter how strongly prohibited by the Mosaic commandments at any other time. It was a recognised custom, too, among the Athenians, to absolve from punishment the murderer, whose hands were yet wet with the blood of his victim, if he sought shelter in the house of a woman carrying her child.

Changes in the Uterus during Pregnancy.—The uterus and its annexæ in the unimpregnated female are, except at the menstrual periods, in a state of quietude, and have but little participation in the affairs of the economy. But as soon as fecundation has been consummated, and even before the vivified ovule reaches the womb, this organ is summoned upon active and continued duty, involving changes in its local condition, which immediately awaken constitutional excitement, and lead directly to increased vital action.* The uterus now becomes a new centre; from a comparatively inert, passive organ it is suddenly converted into one of the highest grade of activity—new duties now devolve upon it—it is no longer in a state of rest—it is converted into a domicile for the accommodation of the embryo; but as this latter requires for its development something more than a place of temporary sojourn, and as, like all living beings, it can only grow by being nourished, there is an afflux of fluids directed toward the uterus, freighted with elements necessary for the nourishment of the germ. These duties and changes incident to the organ, necessarily impart to it increased structure and volume; and in proportion as these changes take place, two orders of phenomena ensue—1. Physiological; 2. Mechanical. The former class appertains to the transmission of influences to the various portions of the economy through the ganglionic system of nerves; the latter has special reference to the pressure and consequent disturbance exercised by the developing uterus on

* Harvey has compared the sudden change occurring in the uterus from impregnation to the lip of a child stung by a bee, "nempe ut puerorum labia (dum favos depeculantur, ut mella liguriant) apum, spiculis icta, tument, inflammantur orisque hiatum aretant." [Harv. Exercitatio 68, p. 438.]

the adjacent organs. We shall, when speaking of the symptoms of pregnancy, call attention in detail to these phenomena, and endeavor to give to each one of them its true value.

Development of Impregnated Uterus—Mucous Membrane.—The microscope has revealed some very interesting facts regarding the manner in which the uterus commences to increase in volume, as a consequence of impregnation. For example, the first change in the structural arrangement of the gravid organ is recognised on its internal or mucous membrane; as early as the second week, it becomes notably thickened in its texture, and assumes a much more lax character; its color is quite red, the result of increase in the contents of the blood-vessels, and folds or plicæ are now perceptible, so that it can be distinctly separated from the muscular coat of the organ. All these changes become much more apparent as the period of pregnancy advances, and the result is that the mucous membrane (except that portion lining the cervix) lapses into an hypertrophied condition, and constitutes the *decidua vera*, to which we shall more particularly allude when treating of the envelopes of the fœtus.

Peritoneal or Serous Membrane.—It is only necessary to recollect the distribution of the peritoneal covering on the anterior and posterior surfaces of the uterus, together with its firm attachment to portions of these surfaces,* to appreciate the necessity for an increase in its elements so that it may, without undergoing laceration, continue the same relations with the gravid uterus, which are shown to exist between it and the unimpregnated organ. It was formerly supposed that the broad ligaments—simply duplications of the peritoneum—were arranged in folds which, under the influence of gestation, expanded, and thus enabled the peritoneal membrane to keep pace, without involving its integrity, with the developing uterus. There is no truth in this hypothesis, and it is now admitted that the peritoneum, in common with the other tissues, really receives, as one of the results of pregnancy, an increase of elements, or, in other words, exhibits an hypertrophied condition.

Muscular Structure.—The muscular tissue of the uterus also undergoes important modifications, which result in a general increase in the volume of the organ. It is a well-established fact that this muscular tissue becomes developed in two ways: 1. By an increase in the pre-existing elements; and 2. By a new formation of them. For the first five or six months of gestation there are generated new fibres, and those which previously existed assume an extraordinary growth, their length presenting an addition of from seven to eleven times, and their width from two to five. The connecting tissue, which unites the muscular fibres, also pre-

* See Lecture 6th.

sents an increase, so that at the end of pregnancy, distinct fibres can be recognised.* Such is the gradual development of the uterus from the time of fecundation until the completion of the period of utero-gestation, that its solid bulk has been estimated by Meckel to be, at the end of the ninth month, twenty-four times greater than in the unimpregnated organ. This excess of development is principally due to the enhanced growth of the muscular tissue, and, as obstetricians, it is interesting for you to know that, until the sixth month of pregnancy, the walls of the uterus undergo a successive thickening, while the cavity also becomes increased; but, after this period, the walls diminish in thickness, and the area of the uterine cavity, in order to accommodate the fetus, is still much augmented. The serous or peritoneal covering, as has just been remarked, also becomes thickened; and there is, in fact, an increase in all the tissues of the organ; the blood-vessels and lymphatics become larger and more distended, and the nerves, whether partly from the production of new nerve-fibres or not, are enhanced in length and width by the growth of their pre-existing elements.

Such, very briefly related, are some of the structural modifications produced in the uterus as the result of pregnancy; and you cannot fail to perceive that all these changes are intended for the accomplishment of two objects, viz. in the first place, for the accommodation of the growing embryo, thus affording it a place of temporary sojourn; and secondly, for the provision of the elements necessary to its nourishment.

There has been much discrepancy of opinion as to the special arrangement or distribution of the muscular tissue of the gravid uterus. Madame Boivin, who gave much attention to the subject, and whose fine delineations of this structure have commended themselves to the highest consideration, recognises in the impregnated womb three orders of fibres: 1. On the external surface of the organ, there are planes of fibres, which proceed from the median line obliquely downward and outward, toward the inferior third of the uterus, passing in the direction of the round ligaments, of which they constitute a large portion; some of these fibres pass also to the fallopian tubes and ovaries; 2. On the internal surface, there are observed circular fibres, and their central point is the internal orifice of the tubes; 3. Between the two planes of fibres just described, there is a third layer, which is regarded as inextricable. On the other hand, Deville has quite recently endeavored to show that Madame Boivin was in error in her description. There are, according to this observer, two orders of muscular fibre on the external surface of the organ—one transverse, the other longitudinal. The former are derived from the round ligament, fallopian tube,

* Kölliker's Microscopical Anatomy, p. 650.

and ovary, and also from the wing of the corresponding round ligament. Near the median line, these transverse fibres are intersected perpendicularly by a longitudinal band, describing curves more or less marked. This longitudinal band originates, in front, near the union of the body with the neck of the uterus, and passes from below upward to the fundus, and again proceeds from above downward on the posterior surface, terminating a little below the junction of the neck and body of the organ.

There is, he remarks, a positive line of continuity between the transverse and longitudinal fasciculi. The former, as soon as they approach the median line, become curved, some downward and others upward, so as to become longitudinal, and in this way do actually constitute the median longitudinal fasciculus. This is observed on both the anterior and posterior surfaces of the organ.

On the internal surface, there is the same general description of the muscular fibres as on the external surface. In Figures 37 and 38, taken from Cazeaux, who acknowledged his indebtedness for them to the courtesy of M. Deville, the arrangement of the muscular structure, as described by this anatomist, is graphically exhibited.



FIG. 37.



FIG. 38.

Constitutional Sympathies.—The changes in the local condition of the uterus are promptly followed by more or less constitutional excitement. One of the very first organs in which this excited action is manifested is the stomach, as is shown by the nausea and vomiting, which, in many instances, so quickly, and, in the great majority of cases, so generally, supervene upon pregnancy. There is very little doubt, I imagine, now entertained as to the manner in which the nausea and vomiting are produced. The uterus, you have seen, becomes, as soon as fecundation is accomplished, a new and active centre. Extraordinary changes of structure ensue; all this necessarily induces more or less irritation from the uterus to

the stomach through a reflex action of the spinal cord; this irritation is transmitted to the stomach, and, as a consequence, nausea and vomiting are developed. Now, I can readily understand that you may, at first sight, imagine this to be an argument against the assumption that pregnancy cannot be properly considered a pathological or diseased condition. But such an inference has no just basis, for I hold that the nausea and vomiting of pregnancy, under ordinary circumstances, instead of being regarded as pathological, are, in truth, physiological phenomena; and it is, in my judgment, precisely for the want of such distinctions that the error has obtained regarding the true condition of the female, while in gestation.

I do not think there is any fact, as a general fact, better established than that pregnant females, who escape nausea and vomiting during gestation, *are exceedingly apt to miscarry*. If this really be so—and your future observation will, I am quite sure, abundantly corroborate the statement—there must be some important connexion between this gastric irritability and a normal pregnancy—a connexion which holds the relation of cause and effect. What are the facts? As soon as impregnation takes place the uterus becomes suddenly congested, and this tendency of the blood toward the organ continues in unbroken currents until the completion of gestation. Without some derivative influence, in the earlier periods of pregnancy, to hold in salutary check this determination of blood toward the uterus, its nervous structure would become so overwhelmed and irritated that premature action of the organ, and expulsion of its contents, would be the consequence. In order, however, to guard against such contingencies, nature has found it necessary, in the plan of her operations, to institute two phenomena—nausea and vomiting—the direct result of which is, for the time, to produce relaxation of the general muscular tissue, and increased activity of that essential emunctory—the perspiratory surface.

I need not explain to you how relaxation of the muscular system, and increased perspiration, necessarily tend to antagonize local congestions. This law, so well established, constitutes the fundamental basis for the therapeutic treatment of inflammatory affections. Why are you told in aggravated attacks of inflammation of any of the vital organs—in pneumonia, for example—to bleed to syncope? Is it not because of the absolute necessity, in order that life may not be sacrificed, that an immediate and powerful impression be made on the system—and what so potent in its influence to break up the local congestion as the two immediate results of syncope—relaxation and free perspiration?*

* I am so well satisfied of the importance, so far as a healthy gestation is concerned, of the two phenomena—nausea and vomiting—and so truly do I regard them as necessary links in the chain of processes instituted by nature for the suc-

another argument, I think, to show how necessary this gastric disturbance is to the completion of pregnancy, and it is this—as a general principle, it subsides about the middle period of gestation, the uterus, by this time, having become accustomed to its new condition, and, therefore, from this cause at least, in no danger of premature action.

Changes in the Blood.—But, gentlemen, let us look at another modification resulting from pregnancy, and see how far, as many writers claim for it, it is entitled to the denomination—pathological—I allude to the change which the blood undergoes during gestation. Through the researches of that clever observer, Andral, subsequently confirmed by the observations of Becquerel and Rodier, the important fact has been established, that, for the first five months of gestation, the absolute quantity of fibrin in the blood is diminished, and that the red corpuscles are also less in quantity. The amount of fibrin, they allege, after this period, is subject to variation; but it ordinarily becomes increased between the sixth and seventh, and eighth and ninth months. It must be remembered that this condition of the blood is not a mere coincidence ascertained to exist in one, two, or three given cases of pregnancy; but the value of the circumstance consists in the broad

successful accomplishment of the work of reproduction, that, when these phenomena are absent, I invariably have recourse to minute doses of ipecacuanha for the purpose of inducing an irritable condition of the stomach. In more than one instance, I have succeeded in this way, in carrying ladies to their full term, who had previously miscarried—and in whom, on inquiry, there could be detected no cause for the miscarriage, *except that they had experienced neither nausea nor vomiting*. In illustration, the following case, among several others, is not without interest: In November, 1851, I was consulted by a lady from the State of Georgia, who imagined she was laboring under some disease of the uterus, which, as she supposed, had prevented her from bearing a living child, having miscarried twice successively at the third month of her gestation. After a very careful examination, I could detect no disease of the uterus, nor could I ascertain, on inquiry, that any of the ordinary special causes had operated in the production of the miscarriages. On questioning her particularly as to the state of her health while pregnant, she laughingly observed: “Why, sir, my health was, in both instances, most remarkable; my appetite was surprisingly good, and I did not know what it was to have a moment's sick stomach.” Judging that this was a case of miscarriage from the absence of the usual symptoms—nausea and vomiting—I so expressed myself to the lady, and enjoined upon her, as soon as she again discovered herself to be pregnant, to commence with from a fourth to half a grain of ipecacuanha once, twice, or thrice a day, as circumstances might indicate, for the purpose of producing nausea, thus simulating, as nearly as possible, the course pursued by nature, when not contravened by influences which she cannot control. This treatment to be continued until about the fourth month of pregnancy, at which time, sometimes earlier, sometimes later, the nausea and vomiting, usually attendant upon gestation, as a general rule, cease. My patient returned home, and, in twelve months afterward, I received a letter from her physician, Dr. Raymond, in which he remarked: “Your remedy has been attended by the happiest result. Two weeks since I delivered Mrs. H. of a fine son.”

ground that this is the general characteristic of the blood during gestation; hence, a pregnant woman may be said to be chloro-anæmic, simulating, somewhat, the condition of chlorosis, between the pathology of which and the blood of pregnancy there is a striking analogy.

This seems, indeed, to come in direct conflict with the very general opinion that pregnancy is usually accompanied by a state of plethora; and hence, under this latter impression, the too common practice is, for any supposed fulness in the head, or pain in the chest or abdomen, the free abstraction of blood by the lancet. This is not only, in my judgment, empirical, but it is oftentimes very pernicious practice. To the abstract practitioner, pain in the head, etc., may indicate plethora, and, consequently, the wisdom of blood-letting. Not so, however, with the well-educated physician, who rejects the testimony of mere symptoms as utterly worthless, unless accompanied by a knowledge of the causes to which they are due. Who, for example, does not know that one of the prominent accompaniments of an anæmic or bloodless condition of the system is intense cephalalgia, with intolerance of light—and are not these, also, the two prominent and distressing symptoms of that most fearful disease, phrenitis, or inflammation of the brain? Then, gentlemen, in the name of truth, what is the value of symptoms, unless elucidated by their antecedents? In the two examples which I have just cited, you see precisely the same character of symptoms, but due to precisely opposite causes. In the one, tonic and stimulant treatment is indicated—while, in the other, the only hope of rescue is in the prompt and uncompromising use of the lancet, and other depletory measures.

The opinion that pregnancy is accompanied by a plethoric condition of system is by no means of recent origin—and it seems to have sprung from the belief generally entertained that, as during gestation there is usually a suppression of the catamenia, the very accumulation of this fluid in the system of the gravid female must necessarily induce a state of plethora. This, however, is false reasoning; for the quantity of blood thus retained can, by no mode of calculation, compensate for the amount provided by the mother for the fœtus and its annexæ, during their intra-uterine development. So generally did the idea of plethora and pregnancy pervade the teachings of many of the early schoolmen, that it was one of their injunctions to bleed the pregnant female at least three times while carrying her child; indeed, the observance of this maxim was regarded as essential to the safety of both mother and offspring. Unfortunately, the error has reached our own times, and, as a mere matter of tradition, has a strong popular support. When engaged in practice you will appreciate the necessity of firmly resisting this delusion, which may almost be considered a popular superstition.

Allow me here to remark that, as a general principle, if the pregnant female observe strictly the ordinances which nature has inculcated for her guidance; if, for example, she take her regular exercise in the open air, avoid, as far as may be, all causes of mental or physical excitement, employ herself in the ordinary duties of her household, partake of nutritious and digestible food, repudiate luxurious habits, the exciting accompaniments of the dance, late hours, late suppers, etc.; if, I say, she will steadfastly adhere to these common-sense rules, the reward she will receive at the hands of nature will be, general good health during her gestation, and an auspicious delivery, resulting in what will most gladden and amply repay her for her discretion—the birth of a healthy child, which is to constitute both the idol of her heart, and the study of her life. But if, in lieu of these observances, the pregnant woman pursue a life of luxury, “eat, drink, and become merry,” neglect to take her daily exercise, and prefer her lounge—then the case is entirely reversed; she becomes plethoric, and, if not relieved by the employment of the lancet,* and other appropriate remedies, she oftentimes dies, having blotted herself from life by her own folly! You see, therefore, that pregnancy *per se* is not, in reality, a condition of plethora, but becomes so through the violation of the laws prescribed by nature; and this is equally true with regard to the general health of the female during her gravid state.

It must, however, be borne in mind that gestation exercises no talismanic influence, nor can it constitute itself an *Ægis* by which to guard the female against the invasion of diseases incident to human nature. For example, a pregnant woman may be attacked with pneumonia, pleurisy, or other of the formidable phlegmasiæ; in one word, she is liable to any of the numerous catalogue of human maladies; and this brings me, for a moment, to the consideration of the treatment of these affections, when occurring in a state of gestation. Hippocrates propounded the maxim that “an acute disease of any kind, seizing a woman with child, generally proves mortal”—*mulierem utero gerentem morte quodam acuto lethali*.† Van Swieten, the illustrious commentator of the no less illustrious Boerhaave, in speaking of this aphorism of Hippocrates, concludes that this unfavorable prognosis of an acute disease in pregnancy was necessarily deduced from what he held touching the abstraction of blood in gestation—“a woman with child, from opening a vein is apt to miscarry”—*mulier utero gerens venâ sectâ abortet*. It is very evident that neither of these maxims of the

* It is very probable that the plethora, in these cases, is due simply to an increase in the amount of water in the blood; but, still, with this assumption, the advantage of the lancet, as a means of temporary relief, cannot be questioned.

† Aphor. 3 tom., ix., p. 213.

father of medicine receives confirmation at the bedside, where, after all, their true value is to be tested.

In the first place, in certain conditions of plethora, brought on in the manner already indicated, accompanied by a bearing-down sensation, febrile excitement, and a bounding pulse, the abstraction of blood from the arm will oftentimes act like magic, imparting to the disturbed system quiet and calmness, such as the lulling of the tempest, and the falling of the waves produce on the bosom of the ocean. Again: my own experience teaches me that acute diseases, if promptly treated, are as amenable to remedies as under any other circumstances; and, furthermore, their therapeutic management should be characterized by the same degree of activity as if pregnancy did not exist. Diseases of a high inflammatory grade are, I am quite confident, frequently fatal in the pregnant female for the reason that the practitioner is timid, his indecision growing out of fear that positive depletion may destroy the child. It seems to me that this is a very false philanthropy; nor has it anything in science either to sustain or justify it. For instance, in a severe inflammation, the mother will perish without prompt and efficient depletion; and, should she die, what becomes of the child she carries in her womb—especially if it should not have attained a uterine development which will enable it to enjoy an independent existence, in which event, it is true, there is a remote possibility of saving it by a post-mortem Cæsarean section?

But, gentlemen, will the active depletion, material to rescue the patient in cases of serious acute disease, necessarily compromise the safety of the child, by depriving it of the nourishment essential to its development? This is an exceedingly interesting and important question, and one concerning which there is a diversity of opinion. It appears to me, however, that it is one of those points not to be determined by the forum, nor by the disputations of the controversialist—it is simply a question of facts. The facts which, to my mind, are conclusive on this subject, and which every observant accoucheur with a moderate field of practice will, from his own personal experience, be enabled fully to confirm, are as follows: 1. Pregnant women, affected with exhausting diseases, and in the last stage of phthisis pulmonalis, are oftentimes delivered of apparently healthy and well-developed children; 2. In cases of excessive nausea and vomiting—continuing nearly the entire period of gestation—thus preventing the female from taking her ordinary nourishment, the child exhibits no evidence of impaired nutrition; 3. When pregnant women are over-fed, it often occurs, especially if they increase much in adipose tissue, that they bring forth diminished children, instituting a striking contrast between their condition and the corpulence of the parent; 4. After convalescence from diseases which have needed prompt and bold depletion, during gestation,

the child exhibits no want of growth or development, but, on the contrary, usually bears the evidences of having been adequately nourished; 5. The attempts made, in cases of pelvic and other deformities of the maternal organs, to cause a diminished growth of the fœtus by restricting the diet of the mother have completely failed.*

There is an interesting circumstance connected with the chloro-anæmic condition of the gravid female, to which it is not unimportant for the moment to allude. Andral† has demonstrated that, in all cases of acute inflammation, there is invariably an increase in the quantity of fibrin; and, furthermore, that this increase is always proportionate to the intensity of the phlegmasia. In order that a clear understanding may be had of this practical point, and proper deductions made in other than inflammatory types of the system, the following table is presented as disclosing the ordinary variations in the quantity of the chief constituents of the blood in a state of health:

Fibrin, . . .	from	2	to	3½	parts per 1000.
Red corpuscles, "	110	"	152	"	" "
Solids of Serum, "	72	"	88	"	" "
Water, . . .	"	760	"	815	" "

According to Andral, the increase in the quantity of fibrin is so unequivocal a sign of inflammatory action, that if more than 5 parts of fibrin in 1000 be detected in the progress of any disease, it may positively be affirmed that some local inflammation exists.‡ It is also shown that, under the influence of inflammation, the maximum increase of fibrin is 13.3, the minimum 5, while the average is 7; and the important fact is proved that, in acute rheumatism and pneumonia, the greatest increase is recognised. Some practitioners are in the habit—and unfortunately the doctrine pervades too many of the books now in your hands—of judging of the necessity of further depletion simply by the peculiar appearance of the blood after it is abstracted from the system—known as the "buffy coat." It would be a sad tale if the countless dead could

* A prominent writer, M. Depaul, suggested in the *Union Médicale*, 12th of January, 1850, the practice of repeated bleedings, together with restricted diet, during the latter half of pregnancy, with the view of arresting the full development of the fœtus. This suggestion, as is evident, was founded upon inaccurate data, and consequently proved valueless, so far as concerned the object for which it was intended.

† See his admirable *Essai d'Hématologie Pathologique*.

‡ What a precious disclosure for the truly observant physician! How often does it happen that, with all the vigilance which can be brought to bear, and all the soundness of human judgment, he is baffled in his diagnosis—especially in what may be termed masked inflammatory action—whether the symptoms are really due to inflammation, or whether the disturbance may not be one of the ever-varying grades of neuralgic pain. In such case, the abstraction of a small quantity of blood will at once develop the mystery by ascertaining the relative proportion of its fibrin. Such, indeed, are the rich fruits growing out of scientific inquiry.

return to earth, and tell how this error has led to their premature destruction! The "buffy coat," while it is indicative, under certain circumstances, of inflammation, is also one of the characteristics of anæmia; and it now seems to be the accepted doctrine that its presence, under any circumstances, is due to one of two conditions: either a positive increase of the fibrin in the blood, in which case the amount of corpuscles may undergo no change; or there is merely a relative increase, in which there is a loss or diminution of the corpuscles. This, you will perceive, is a very important distinction; for it is in the latter instance, especially, in which the "buffy coat" will display itself, not because of the inflammation, but simply because of a *disproportion between the fibrin and corpuscles*. Now, such disproportion is found to exist in pregnancy, in chlorosis, etc., and, as a consequence, both of these conditions of system are characterized by the "buffy coat."*

You see, therefore, gentlemen, how necessary it is, in the practice of our profession, to take an enlarged view of science—to collect, as it were, all the facts, and not be content with an isolated or fragmentary consideration of a principle; rigid and searching analysis, and legitimate deductions from well-established premises, are the elements which our science greatly needs, and they are the elements, too, which will consecrate her discoveries as so many truths, and give them value and efficiency when applied to the amelioration of human suffering, or to the arrest of disease. How often, in the clinic, have I had occasion to call your attention to the subject of chlorosis, and, in connexion with its pathology and management, to remind you that one of the characteristics of this affection, which is essentially a disease of debility, is the "buffy coat." You have been told of the fatal error of depletion in chlorosis—and yet this error is constantly committed by those who believe that the "buffy coat" is always the index of inflammatory action. It may surprise you—but still the fact is susceptible of demonstration—that even at this day, amid the rich accessions which research and progress are daily contributing to our professional domain, and amid the lights which science is constantly shedding upon those who worship at her shrine, the general belief, so far as practice is concerned, is that whenever the "buffy coat" is recognised, it is an urgent indication for the necessity of further depletion!

* The fibrin increases during pregnancy; its general average quantity in this condition is 3.40, but during the last two months it is 4.08. The blood of the pregnant woman also undergoes a change in the proportions of its albumen, water, and iron. The average quantity of albumen contained in blood is 70.5; M. Regnaud has shown that the average of this element during gestation is 67.17. In the first seven months it is 68.84; in the two last, 66.42. The increase in the water of the blood is also shown by the same observer. The average quantity of water is 791.1; while during pregnancy it is 817. Becquerel and Rodier have demonstrated that there is a slight diminution in the quantity of iron. [Dubois and Pajot, op. cit.]

Modifications in the Urinary Secretion.—That the urine of the pregnant female undergoes certain changes, is by no means a discovery of our own times. The fact is alluded to in the writings of Hippocrates and other of the early fathers.* Within the last twenty or thirty years, special attention has been directed to an element in the urine—kiestein; this name was, I believe, given to it by Nauche, who, together with numerous others, including our own countryman, Dr. Elisha Kane,† has made some interesting contributions on the subject. Kiestein consists of a whitish pellicle; and, when completely formed, its appearance has been compared to the scum of fat, which is observed on the surface of cold broth. Dr. Kane, in eighty-five cases of pregnancy, recognised a well-defined pellicle in sixty-eight; in eleven the pellicle was but partially formed, while in six it was absent. The pellicle will sometimes be detected thirty-six hours after the excretion of the urine, and again not until the eighth day. Kiestein has been observed as early as the fifteenth day after fecundation, and frequently at the second month. From the third to the sixth month, it exhibits its most marked characteristics; from the seventh month, it gradually diminishes.

Why should this element, kiestein, be found in the urine of the pregnant and parturient female? It is absurd to suppose that it is there as a mere coincidence; and we, therefore, are justified in asking some explanation of its presence. Is the kiestein in the urine anything less than a demonstration, that nature is engaged in the elaboration of food necessary for the infant as soon as it is born—and is the passage of this substance from the system, through the kidneys, any less of a demonstration than its accumulation in the blood would be productive of injurious consequences? Both of these circumstances seem to receive confirmation from the important fact, that, when the child takes the breast, and the secretion and excretion of milk through the mammary organs are in full operation, there is no longer any kiestein to be detected in the urine; in addition, among the constituents of kiestein is casein, which, you should remember, is an important element in human milk.‡ Again: recently Blot has announced to the French Academy of Medicine the interesting fact that *sugar exists normally in the urine of all parturient women, of all nursing women, and likewise in the urine of a certain number of pregnant women.*§ Here, then, are two ele-

* In 1560, Savonarola spoke very particularly of the modifications of the urinary secretion consequent on gestation, and his description of these changes would seem to indicate that the substance known as kiestein had actually been recognised by him, although not under that name. [Practica Canonica de febribus, pulsibus, urinis, &c. By J. M. Savonarola, 1560.]

† The American Journal of Medical Sciences. 1842.

‡ Kiestein is not invariably found in the urine of the pregnant female, and may be produced by numerous pathological conditions of the system.

§ It is proper to state that the announcement of Blot has been regarded as erro-

ments, casein and sugar, both components of human milk, found in the urine, and consequently must exist in the blood of the puerperal woman.

In certain cases, the urine of the pregnant female is found to contain albumen in greater or less quantity, and it is stated as an interesting fact that the albuminous urine of pregnancy does not produce re-action with the liquor of Barriwil, while the same character of urine assumes a violet color, and produces a dark precipitate in cases of Bright's disease.

Pregnancy, therefore, is a modified condition of the system, but not a diseased condition; and the type of the modification is, as a general rule, in exact relation with the demands of nature for the accomplishment of the great and mysterious object in which she is engaged—the reproduction of the species. You are not, however, to understand me to say, that pregnancy is not oftentimes complicated with disturbed action, amounting to disease, which will require all your vigilance, and a full measure of skill, to arrest it. The very vomiting to which we have alluded as, under ordinary circumstances, constituting one of the physiological phenomena of gestation, sometimes places in such imminent peril the safety of the mother, that it not only requires the interposition of the accoucheur, but at the same time presents for consideration one of the gravest topics in the whole practice of midwifery, viz. *premature artificial delivery*—which question we shall fully discuss under its appropriate head.

Is the Female Pregnant?—With these general observations, we shall now enter upon the discussion of the question—*How are you to know that pregnancy exists?* And here, gentlemen, we approach a subject which, in every respect, is entitled to your profound attention. Many of you are, as it were, just on the threshold of life, ignorant of the ways of the world, and, therefore, unable to appreciate, on the one hand, the schemes of the depraved, and, on the other, the sad wrongs to which the innocent are oftentimes subjected. You will not be engaged in practice long before you will be called upon to appreciate, in all their stirring truth, the solemn obligations to society, which your profession will necessarily impose upon you; nor can you form any adequate idea of the influence which you, as medical men, are destined to exercise in the communities in which you may respectively become resident. Touching this very question of pregnancy, your opinion will be invoked by the judges and the lawyers of the land; it may become your province to stay the arm of the law in the execution of retributive jus-

neous by Leconte, who has seen that the quantity of uric acid is increased in the urine of nursing women, which fact, he thinks, is the cause of the supposed error of Blot. On the other hand, Brucke maintains that sugar does really exist in a notable amount in nursing women.

tice; and, on the accuracy of your decision, may depend not only the well-being of society and the happiness of individuals, but human life itself will often be at your mercy. In most Christian countries, in accordance with the legislation of the Egyptians on this subject, the law obtains that if a female shall be convicted of a high offence, the penalty of which is death, the sentence shall be suspended, if it be proved that she is pregnant.*

Who, in a plea of this kind put forth by the unhappy creature, in the hope that the day of her ignominy may be postponed, will be called upon to decide the truth or falsity of that plea? It is a question not within the jurisdiction of the learned courts—their province is to sift evidence as presented by witnesses on the stand, and, through the proper poising of the scales of justice, to protect innocence, and award to crime the decrees of the commonwealth. The plea, gentlemen, will be submitted to the decision of the medical man, and upon his testimony will the issue be determined. Again: imagine the case of a woman, who, in the desire for gain, or urged on, perhaps, by some more malignant motive, charges the father of a family with having violated her person; and thus, with a view to a successful issue of her scheme, feigns pregnancy. In this case, too, the testimony of the medical man must decide the question. A woman who has strayed from the path of virtue, and whose abandonment results in impregnation, studiously endeavors, if not lost to all sense of propriety, to conceal her situation; and when she approaches the medical practitioner for counsel, will have recourse to every art and subterfuge by which she may hope to delude his judgment, and accomplish the fiendish purpose of throwing a mantle around her own shame, by the destruction of the child she carries within her!

When engaged in the practice of your profession, you will frequently be consulted by persons of this description, and, if you suffer your judgments to be dazzled, or your feelings to become too deeply interested, the most painful consequences may ensue. To distinguish between actual pregnancy, and the numerous diseases capable of simulating it, requires on the part of the accoucheur extraordinary circumspection; and as he is, from the very nature of his profession, the only earthly tribunal to which the final appeal is made in cases involving the dearest interests of society, and the

* It is marvellous that so enlightened a country as England should be guilty of the strange inconsistency of recognising the plea of pregnancy as a motive for a stay of execution, and yet be so indifferent, in her legislation, as to the manner in which that plea shall be tested. In the decision of a question, involving such grave consequences to both the guilty parent and her innocent child, instead of submitting the arbitration to well-educated and experienced medical men, the law calls for a jury of twelve ignorant women, and the issue depends, not upon whether pregnancy actually exists, but upon whether or not the woman has *quickened*. This is, indeed, singular legislation!

sacred rights of individuals, it follows that the responsibility imposed upon him is most fearful.

A case occurred some years since in this city, which is well calculated not only to arrest attention, but to fix on the mind the necessity of positive knowledge in obstetric medicine, and the value of accurate diagnosis in disease. A female applied for professional advice; she had for some time previously labored under general derangement of health, and was most solicitous for relief. The practitioner whom she consulted, being much embarrassed by the history of the case, requested the opinion of several medical friends. The consultation resulted in the unanimous decision that the patient was affected with dropsy, and it was proposed that the operation of paracentesis, or tapping, should be performed. The medical gentlemen assembled, according to appointment, and the trocar was thrust into the abdomen of the confiding woman; no fluid, however, escaping; it was, indeed, literally what has been denominated a "dry tap," and you may well imagine the astonishment of the spectators. A few days subsequently, the patient died from the effects of inflammation, and the autopsy revealed the interesting but astounding fact, that the instrument, instead of passing into what was supposed to be an accumulation of fluid, was thrust into the very heart of a living fœtus! What greater misfortune could befall any one of you than an error like this—to survive it, would require almost a lifetime, so far as your professional reputation is concerned, to say nothing of the stinging rebukes of conscience.

But, gentlemen, it will sometimes become your duty to shield innocence against the suspicions of an unjust world, and vindicate purity against the assaults of the base and heartless; and it is in instances like these in which the question of pregnancy, as a mere point of diagnosis, becomes invested with its highest degree of interest. Can you imagine anything more melancholy than the wanton destruction of character through mere suspicion, unless, indeed, it be the destruction of character through the cabals of the depraved? You will, I am sure, pardon me, for mentioning the following touching case, which occurred in my practice some years since; and which carries with it its own sad moral; it is worthy of meditation, and is a proper exponent of scenes, which you may be called upon to encounter in your professional career. May it impress you with the fulness of your responsibilities as medical men, and cause you to appreciate the sacred offices of your profession:

I was requested to visit a lady, who was residing in the State of New Jersey, about thirty miles distant from New York. I immediately repaired to her residence, and, on my arrival, was received by her father, a venerable and accomplished gentleman. He seemed broken in spirit, and it was evident that grief had taken a

deep hold of his frame. On being introduced into his daughter's room, my sympathies were at once awakened on beholding the wreck of beauty which was presented to my view. She was evidently laboring under that bane of human existence, consumption, and it was quite manifest from her wasted frame, that death had claimed his victim. My presence did not seem to occasion the slightest disturbance, and with the smile of an angel playing on her countenance, she greeted me with these words: "Well, doctor, I am glad to see you on my beloved father's account, for he will not believe that I cannot yet be restored to health. Life, however, has lost all its charms for me, and I impatiently long for the repose of the grave." These words were spoken with extraordinary gentleness, but yet, with an emphasis, which, at once, gave me an insight into the character of this lovely woman.

Her father was a clergyman of high standing in the English church, and had a pastoral charge in England, in which he continued until circumstances rendered it necessary for him to leave that country, and seek a residence in America. At a very early age, this young lady had lost her mother, and had been almost entirely educated by her father, whose talents, attainments, and moral excellence admirably fitted him for this important duty. When she had attained her eighteenth year, an attachment was formed between her and a young barrister of great promise and respectability. This attachment soon resulted in a matrimonial engagement. Shortly after the engagement she began unaccountably to decline in health; there was a manifest change in her habits; she was no longer fond of society; its pleasures ceased to allure and prove attractive; the friends whom before she had caressed with all the warmth of a sister's love, now became objects of indifference; in a word, she was a changed being—her personal appearance exhibited alterations evident to the most superficial observer; her abdomen enlarged, the breasts fuller than usual, the face pale and care-worn, and the appetite capricious, with much gastric derangement. Many were the efforts made to account for this change in the conduct and appearance of the young lady in question. Speculation was at work, and numerous were the surmises of her friends. The rumor soon spread that she was the victim of seduction, and her altered appearance the result of pregnancy.

The barrister to whom she was affianced heard of these reports, and instead of being the first to stand forth as her protector, and draw nearer to his heart this lovely and injured girl, thus measurably assuaging the intensity of grief with which she was overwhelmed, addressed a letter to her father requesting to be released from his engagement. This was, of course, assented to without hesitation. The daughter, conscious of her own innocence, know-

ing better than any one else, her own immaculate character, and relying on heaven to guide her in this her hour of tribulation, requested that a physician should be sent for, in order that the nature of her case might be clearly ascertained. A medical man accordingly visited her, and, after an investigation of her symptoms, informed the father that she was undoubtedly pregnant, and suggested that means should be instantly taken to keep the unpleasant matter secret. The father, indignant at this cruel imputation against the honor of his child, spotless as he knew her to be, spurned the proposition, and instantly requested an additional consultation. This resulted in a confirmation of the opinion previously expressed, and the feelings of that parent can be better appreciated than portrayed.

Without delay, that good man determined to resign his pastoral living, gather up his little property, and proceed with his daughter to America, where, in a land of strangers, he hoped for that comfort and peace of mind, which had been denied him in his own native home. On her passage to this country, the daughter became extremely ill, and there being a physician on board the vessel, his advice was requested. After seeing the patient—she was affected at the time with excessive vomiting from sea-sickness—he told the father there was danger of premature delivery. Such, therefore, was the general appearance of this lady, that a medical man, taking simply appearances as his guide, at once concluded she was pregnant.

This is about the substance of what I learned of this interesting and extraordinary woman, and my opinion was then requested as to the character of her malady. My feelings were very naturally much enlisted in her behalf, and I proceeded with great caution in the investigation of her case. Without entering at this time into details as to the manner in which I conducted the examination, suffice it to say that, after a faithful and critical survey, most minutely made in reference to every point, I stated in broad and unequivocal language—that she was not pregnant. The only reply this gentle creature made on hearing my opinion, was—"Doctor, you are right!" These words were full of meaning, and their import I could not but appreciate. They were uttered neither with an air of triumph, nor with any feeling of unkindness toward those, who had so cruelly abused her.

The father was soon made acquainted with the result of my examination, but he indicated not the slightest emotion. His bearing was quiet and dignified. It was evident that he had never for one moment faltered in the belief of his daughter's virtue, nor did he require from me or any other living being the assurance that his child had been shamefully wronged. He asked me with great solicitude whether something could not be done to restore her to health, and I thought the old man's heart would break, when I

told him, that his daughter was in the last stage of consumption. It was the misfortune of this young lady, to labor under an affection of the womb, which simulated, in several important particulars, the condition of pregnancy, and which the world, in its ignorance and undying thirst for scandal, might have readily supposed did in fact exist: yet, there was no excuse for the physician, guided as he should have been by the lights of science, and governed by the principles of a sound morality.

When I stated unequivocally, and without reservation, to the lady that she was not pregnant, I gave an opinion which I knew would stand; my examination was conducted with the single object to reach the truth, irrespective of any other consideration; my sympathies, it cannot be denied, were altogether with this afflicted girl; but they were not so irresistible as either to blind my judgment, or cause me to surrender what I knew was due both to science, and my own reputation as a medical man. The result of the investigation impressed me with the conviction, beyond any shade of doubt, that the entire train of symptoms, indicating gestation, was due to an enlargement of the uterus, altogether unconnected with pregnancy, produced by the presence of a large fibrous tumor occupying the cavity of this organ. This opinion, I admit, was not arrived at without some degree of caution—caution in every way justified by the peculiar nature of the issue involved in the decision.

I left the father with the pledge that he would inform me of the dissolution of his daughter; and thus afford an opportunity, by a post-mortem examination, of testing the truth of my opinion. About four weeks from this time, I received a note announcing her decease, and asking that I would immediately hasten to the house, for the purpose of making the examination. Dr. Ostrom, now practising in Goshen, at my request, accompanied me, and assisted in the autopsy. It may surprise you, gentlemen, yet it is an interesting fact to communicate, for it exhibits the true and unwavering character of the man, that, during the post-mortem examination, the father stood by and witnessed every stage of the operation; his form was erect, his face pale and thoughtful, and so crushed was his heart that one tear, it seemed to me, would have broken the agony of his grief. As he stood before me he was not unlike the stricken oak in the forest, which, though stripped of its branches, was yet upright and majestic. The moment I had removed the tumor from the womb he seized it convulsively, and exclaimed; "This is my trophy; I will return with it to England, and it shall confound the traducers of my child!"

Here, you perceive, both character and life were sacrificed by error of judgment on the part of those whose counsel had been

invoked. Without a due appreciation of their responsibility, heedless, as it were, of the distressing consequences which would inevitably result from the erroneous decision of a case in which character was so deeply involved, the medical gentlemen, unjust to themselves and to the profession of which they should have been in part the conservators, rashly pronounced an opinion which consigned to an early grave a pure and lovely being, and broke the very heart-strings of a devoted and confiding parent.

Let me, then, gentlemen, by every sense of duty, by the very love which should animate you to become, in these trying emergencies, the firm and uncompromising dispensers of rigid justice; let me, I repeat, by these considerations, urge you to a faithful and devoted study of the means by which alone you will be enabled to arrive at positive conclusions upon this momentous question. The entire investigation is simply one of evidence, and what is most needed, will be to separate true from false testimony; to bring yourselves to the consideration of the subject with but one object in view—the elucidation of truth. With preconceived opinion, or with prejudice, you have nothing to do. Let your minds, in the examination of this question, be “like a sheet of white paper,” with no bias for or against; and let it be your inflexible resolution to decide by the testimony, so help you God!

It shall be my purpose, in the succeeding lecture, to examine the nature and value of this testimony.

LECTURE X.

Evidences of Gestation; how divided; their Relative and Positive Value—**Suppression of the Catamenia**—Can a Pregnant Woman Menstruate?—**Nausea and Vomiting** material to a Healthy Gestation—**Depraved Longings**—**Salivation of Pregnancy**; how distinguished from Mercurial Salivation—**Salivary Glands in Connexion with the Mammæ in the Female, and the Testes in the Male**—**Sympathy between**; **Illustration**—**Parotitis**—**Mammary Changes**—**Secretion of Milk** not always dependent upon Pregnancy—**Milk in the Breast of the Virgin, and in the Male**—**Mammary Metastasis**—**Illustration**—**The Areola**; its Value—Color not its Essential Attribute—**Deposit of Black Pigment and Excitement of the Sexual Organs**—**Connexion between**—**The True Areola**; its Value—**Areola around the Umbilicus**—**Discoloration of Integument between Umbilicus and Pubes**—**Dr. Montgomery's View of Areola**—Can Pregnancy exist without the Areola?—**Changes in Uterus and Abdomen**—**First two Months of Gestation**, Uterus descends into Pelvic Excavation—**Consequences**—**Vesical Irritation**—**Pain and Depression of Umbilicus**; how Explained—**Impregnated Uterus at end of third Month**—**Gradual Ascent of the Organ**—**Right Lateral Obliquity**—**Pain in Right Side**; how Explained—**Uterus at end of eighth Month**—**Cough and Oppressed Breathing**; **Reasons for**—**Projection of Umbilicus**; its Value as a Sign of Pregnancy—**Uterus at end of ninth Month**—**Contrast with eighth Month**—**Ascent of Organ in Primipara and Multipara**; **Difference Explained**—**Bladder and Urethra**; **Change in Position**—**Thrombus of Vagina and Vulva**—**Edema of Lower Extremities**; how accounted for.

GENTLEMEN—The evidences of gestation may be said to possess different grades, and, therefore, we have, 1. Presumptive evidence; 2. Probable evidence; 3. Positive or unequivocal evidence. Each of these classes or grades of testimony has its own special source, and is due to certain special influences, which it becomes you as obstetricians thoroughly to comprehend. The presumptive and probable evidences may or may not be the result of gestation, for the important reason that they may be the product of various morbid conditions of the uterus or other organs of the system, with which pregnancy itself has no sort of connexion. But, on the contrary, the positive, unequivocal evidences are alone the offspring of impregnation; so that, when this latter class of testimony is recognised, it is undoubted proof that pregnancy exists; it must be remembered that it is the only proof which will justify the opinion—when any important issue is involved in the decision—that a woman is really with child. You see, therefore, how essentially necessary it is, in the examination of this subject, to draw a broad distinction between certain and uncertain evidence;

and, on no account, to suffer your minds to become bewildered by false or collateral issues. The point to be determined is simply—Does pregnancy exist? It is precisely like any other case, the decision of which depends upon testimony; the only difference being that, in courts of justice, the issues are determined by human or oral evidence, while with us, we have oftentimes nothing to guide us in our deliberations but the silent, yet eloquent language which nature employs as the true exponent of the condition of the economy.

Presumptive Evidences:

1. *The Suppression of the Catamenia.*—A very marked belief has obtained that when a female becomes impregnated she ceases to menstruate during the period of her gestation. As a general rule this is undoubtedly true; but there are so many other conditions of the system in which this function becomes temporarily arrested, that, by itself, it is of little or no value as a sign of pregnancy. It is strange that so good an observer as Denman should have regarded the suppression of the catamenia as an unerring proof of gestation; or, in other words, that a pregnant woman never menstruates. It can scarcely be necessary to enter into an argument to prove how unsupported this opinion is by facts. You have seen in the clinic more than one case, in which the function continued with regularity during the whole period of pregnancy.* I have attended a lady in this city in four confinements, who has not had her courses suppressed during any of her pregnancies, and who was never positively certain of her condition until the period of quickening. Again: it is not uncommon for young married women to have a slight show for two or three periods after their first impregnation;† and ignorance of the fact has often led to a false diagnosis.‡

It should be recollected, too, that the menses will occasionally become arrested soon after marriage, and continue so for one or more months without the existence of gestation, the arrest of the function in these cases being most probably due to the new relations of the individual. It is necessary, also, to remind you—so universal is the popular opinion that when a woman becomes preg-

* See Diseases of Women and Children, p. 171.

† This circumstance seems to have been well understood by Van Swieten, who says, "However, although naturally the menstrea cease in a woman with child, yet with some it happens that during the first months of pregnancy they shall continue to flow without injury to the fœtus, but for the most part in a smaller quantity." [Commentaries, vol. viii., p. 397.]

‡ Dr. Elsasser, of the Stuttgart Lying-in Hospital, records fifty cases in which menstruation occurred during pregnancy, as follows: once in 8, twice in 10, three times in 12, four in 5, five in 6, eight in 5, and nine times in 2 instances. It occurred most frequently in early pregnancy; fifteen were primiparæ, thirty-five multiparæ.

PLATE I



Third month



AREOLA OF THE BREAST
Fourth month

nant she ceases to have "her turns"—that in cases in which a female desires to conceal her situation, she will sometimes mark her linen with blood, in the hope of imposing upon the practitioner and others, in reference to her true condition.

Is Ovulation incompatible with Gestation?—It would seem in perfect keeping with the physiology of ovulation that this function, as a general rule, should cease as soon as fecundation has been accomplished, and its suppression continued during the entire period of the gravid state. The relations of the uterus and ovaries, when fecundation has been effected, become, for the time being, changed. The former constitutes a new centre, and there is a constant increase of fluids toward it in order that it may be enabled to accomplish the nutrition and development of the fetus. The ovaries, on the contrary, although they do actually become enlarged during pregnancy, surrender their special function—the periodical ripening of the ovules. This, I repeat, is undoubtedly the rule; but, like all rules, it has its exceptions. The fact that a menstrual flow is possible in gestation necessarily involves the admission of ovulation; for the sanguineous discharge which ordinarily characterises the menstrual period is but the product of ovulation. At the same time it must be admitted that the regular catamenial evacuation through the term of pregnancy must be regarded as an extremely rare exceptional circumstance; and when it does continue after the early months, the discharge of blood can only proceed from the cervix or upper portion of the vagina, the connexion of the ovum with the internal surface of the organ being such as to prevent any portion of this surface from constituting the source of the discharge.

As menstruation, when it takes place during pregnancy, is most apt to occur in the first two or three months, it might possibly be confounded with a threatened miscarriage; the distinction, however, would consist in the more or less regularity of its recurrence, and its periodical cessation, together with the fact of an absence of any appreciable cause to which the discharge of blood could be ascribed. It should also be recollected that the appearance of the catamenia, in consequence of the congestion accompanying it, would itself, in the earlier period of pregnancy, be likely to provoke miscarriage. Hence, in cases like these, the importance of sound judgment; let the patient, at the time, be kept quiet, and, if plethoric, the abstraction of a small quantity of blood, with a soluble condition of the bowels, would be indicated. If, on the contrary, she be in an opposite condition—nervous and irritable—then the soothing influence of antispasmodics or anodynes is the resource.

There are, however, other conditions of the uterus than a threatened miscarriage, which might possibly be mistaken for the catamenia—such as a polypus, ulcerated carcinoma, or even a

fibrous tumor developed within the uterine cavity, each of which would be accompanied with more or less sanguineous discharge, and it may also be added that the hemorrhage consequent upon placenta prævia might, under certain circumstances, lead to embarrassment in diagnosis.

Menstruation only during Pregnancy.—The experience of Dewees, Baudelocque, and others, seem fully to establish the circumstance—and examples are given by these writers—that, as exceptional cases, some women menstruate during their gestation and at no other time. Deventer cites a remarkable case in which menstruation occurred during gestation only, in four successive pregnancies. Instances, well authenticated, are also recorded showing the possibility of impregnation before the first menstrual eruption, and also after the final cessation of this function, so far, at least, as the sanguineous discharge is concerned; and, again, you will meet sometimes with examples of pregnancy during the period of lactation before the reappearance of the catamenia; so you see, gentlemen, that the catamenia, whether present or absent, establishes nothing, *per se*, as to the existence or non-existence of gestation; and I may observe, while you remember the general rule, that pregnancy is followed by suppression of the menses, you are also to bear in mind the numerous exceptions.

2. *Nausea and Vomiting, with Depraved Appetite.*—I have already remarked to you that women, when they become pregnant, are usually affected with sick stomach, and you have also been informed of the importance of this gastric irritability to a healthy gestation. It is an interesting fact that, in some females, nausea manifests itself almost simultaneously with the act of fecundation. I have known ladies who, from this very circumstance, would positively affirm that they were pregnant, and the result proved that they were right.*

The nausea and vomiting of gestation are peculiar, and differ from idiopathic or primary vomiting in the important fact that, in the latter, there is an indication of more or less primary disease of the stomach; while, in the former, there is no such indication, nor are there any symptoms of general ill-health; as soon as the contents of the stomach have been ejected, the female is, for the time being, quite comfortable. Ordinarily, the nausea and vomiting of pregnancy cease about the period of quickening, and frequently earlier. Sometimes, however, they will recur during the last two

* There are some curious cases reported in support of this opinion. "I was engaged to attend a lady in her fourth labor, which she told me she expected would take place on the 12th of November, early in the morning of which day I was sent for, and she gave birth to a daughter; she told me that she had always reckoned nine months from the first feeling of nausea, and had never been mistaken." [Montgomery, p. 90.]

or three months of gestation, and this seems to be dependent upon mechanical causes. The uterus in its ascent at this period induces more or less irritation of the stomach through the pressure exercised upon it, and hence vomiting, under these circumstances, will be more likely to take place immediately after a meal, in consequence of the greater distension of the organ. I say that the irritability of the stomach in the latter periods of pregnancy is chiefly mechanical; it is well to distinguish it from the nausea and vomiting of the earlier months, which I hold to be altogether physiological, and which has been explained, in the preceding lecture, to be due to a reflex action of the spinal cord from the uterus to the stomach.*

It must, however, be borne in mind, that mere functional or organic disease of the uterus will oftentimes be followed by this irritability of stomach; it is, indeed, a very common result of suppression of the courses from any of the causes, with which pregnancy itself has nothing whatever to do.

I am not a little surprised that so accomplished an obstetrician,† and so valued an authority as Paul Dubois, should say, that vomiting is not necessarily associated with gestation. Indeed, I regard this symptom as among the most constant accompaniments of pregnancy, and its relation to this state, as a general rule, is based on sound physiology.

3. *Depraved Appetite.*—A frequent consequence of impregnation is a depraved appetite—a longing for unnatural food—so that some of your patients will consume, with infinite gusto, chalk, slate-pencils, and other kindred dainties. Some become passionately fond of fruits; I knew a case in which the lady exhibited such a passion for oranges, that the quantity she consumed is altogether incredible. On the authority of Tulpus,‡ salt fish will sometimes present irresistible charms.

I attach more than ordinary importance, as a sign of pregnancy, to this depraved appetite, and am disposed to regard it, under certain conditions, as quite a significant circumstance. For example, if a married woman, whose general health has been uniformly good, should suddenly exhibit this morbid taste, I should be much inclined to look upon it, all things being equal, as a strong presumptive evidence of impregnation. If you ask me to explain why, my answer is, I cannot, except as a matter of observation. But there

* It was the opinion of Haller that the vomiting in gestation is occasioned by a putrid element in the seminal fluid of the male, which, becoming mingled with the blood, constitutes a sort of poisonous miasm; this may be classed among the fanciful notions not unfrequently met with in the writers of the past.

† *Traité Complet de l'Art des Accouchemens*, p. 503.

‡ "I once saw a woman who, being with child, was so exceedingly fond of salted herrings, that before delivery she had eaten fourteen hundred, and this without any offence to her stomach, or prejudice to her health." [*Art, Obstetric-compend.*, p. 68.]

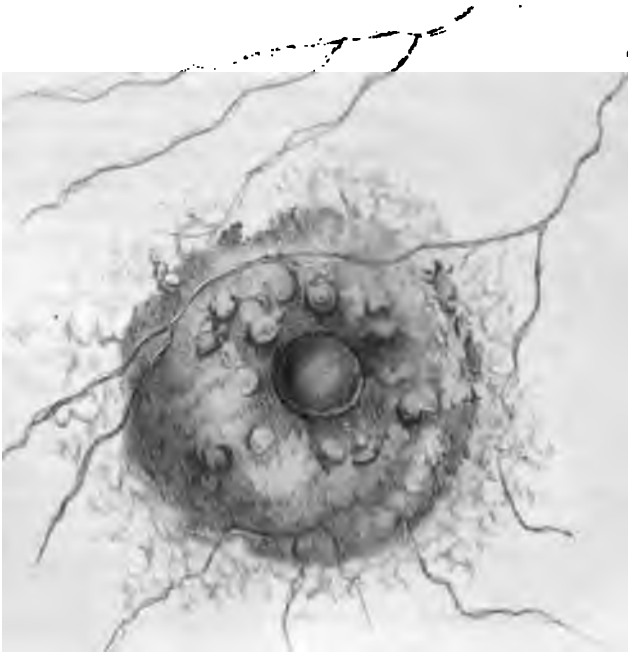
are many things, which I firmly believe, and yet cannot comprehend, except on the principle of faith. Man's belief would be sadly curtailed if he rejected everything for which he could not give a satisfactory explanation. You believe in God, and yet who among you can comprehend his infinite existence? You believe in eternity, and where is the human intellect adequate to the comprehension of the vast theme?

Salivaria.—In connexion with this depraved taste, it may be mentioned that some women, during their pregnancy, will exhibit *ptyalism* or *salivation*, and secrete enormous quantities of saliva. But the *ptyalism* of pregnancy differs from that of mercury in the fact that there is no mercurial taint, no soreness or sponginess of the gums, the irritation being confined to the salivary glands themselves; and here allow me to remark, by way of episode, that these discharges should not be lost sight of, for it may, peradventure, happen that your reputation may be more or less involved in the recognition of them. Let us suppose a case in illustration: Mrs. A. comes to you during her pregnancy: her bowels are torpid, or, for some other reason, you judge it necessary to order an aperient medicine. Soon after this she becomes *salivated*. You are at once charged with having administered mercury: you are severely censured, and, in all probability, your *exeat* will be very unceremoniously furnished you, not with a God-speed invocation, but with all imaginable prejudice against you and your skill as a physician. To a young man just commencing professional life, and without reputation to sustain him, such a contingency would prove a severe trial, unless he could promptly and satisfactorily show that the *salivation* complained of was one of the occasional phenomena of pregnancy; and his justification would be fully established by the diagnostic evidences of this latter form of *ptyalism*, to which we have already alluded.

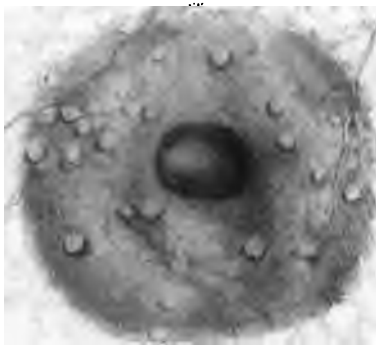
The question of *salivation* during pregnancy, in a physiological sense, is interesting, for there can be no doubt of the sympathy existing between the sexual organs, both in the male and female, and the salivary glands. In *parotitis*, or mumps, in which the parotid gland becomes the seat of inflammation, it is quite usual, after a few days, for the testes in the male, and the *mammæ* in the female, to become enlarged and painful; as soon as this enlargement takes place, the tumefaction of the parotid disappears. Instances, also, will sometimes occur of malignant disease, developing itself in the submaxillary and parotid glands of women at the period of the final cessation of the menses.

Changes in the Breasts—*The Secretion of Milk*—*The Areolæ*—The general rule is that, soon after impregnation has taken place, the breasts become the centre of an afflux of fluids, and consequently; the enlargement is accompanied by more or less

PLATE II



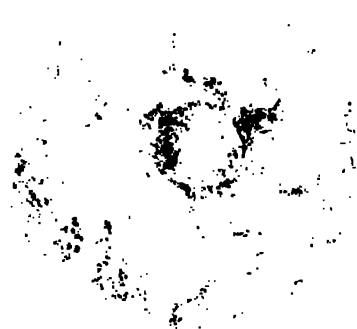
Fifth month



AREOLA OF THE BREAST
Sixth month

The first of these was the discovery of gold in California in 1848. This discovery led to a great influx of people to California, and the state became a free state in 1850. The second was the discovery of gold in Colorado in 1859. This discovery led to a great influx of people to Colorado, and the state became a free state in 1876. The third was the discovery of gold in Nevada in 1859. This discovery led to a great influx of people to Nevada, and the state became a free state in 1864. The fourth was the discovery of gold in Idaho in 1860. This discovery led to a great influx of people to Idaho, and the state became a free state in 1890. The fifth was the discovery of gold in Montana in 1865. This discovery led to a great influx of people to Montana, and the state became a free state in 1889. The sixth was the discovery of gold in Wyoming in 1869. This discovery led to a great influx of people to Wyoming, and the state became a free state in 1890. The seventh was the discovery of gold in Utah in 1871. This discovery led to a great influx of people to Utah, and the state became a free state in 1896. The eighth was the discovery of gold in Arizona in 1876. This discovery led to a great influx of people to Arizona, and the state became a free state in 1909. The ninth was the discovery of gold in New Mexico in 1878. This discovery led to a great influx of people to New Mexico, and the state became a free state in 1906. The tenth was the discovery of gold in Texas in 1880. This discovery led to a great influx of people to Texas, and the state became a free state in 1845.

The discovery of gold in California in 1848 was the first of a series of discoveries that led to the discovery of gold in other parts of the United States. The discovery of gold in Colorado in 1859 was the second, and the discovery of gold in Nevada in 1859 was the third. The discovery of gold in Idaho in 1860 was the fourth, and the discovery of gold in Montana in 1865 was the fifth. The discovery of gold in Wyoming in 1869 was the sixth, and the discovery of gold in Utah in 1871 was the seventh. The discovery of gold in Arizona in 1876 was the eighth, and the discovery of gold in New Mexico in 1878 was the ninth. The discovery of gold in Texas in 1880 was the tenth.



of a pricking or stinging sensation; they are much firmer to the touch, and enjoy a greater degree of mobility. This greater firmness and mobility are not usually observed in the mammæ, when their increase of size is merely dependent upon the accumulation of fatty material. The nipple, in consequence of the tumefaction, is more prominent, and oftentimes painful. The veins, coursing along the breasts, become distended, and can be distinctly traced by the naked eye. The particular period after pregnancy at which these changes occur is variable; sometimes they begin to develop themselves in two or three weeks, sometimes not until the lapse of two or three months, and, in women of delicate constitution, there will oftentimes be little or no change in the size of the mammæ until the latter months of gestation. Indeed, I have seen cases in which, even after delivery, there could be detected not the slightest physical alteration, and generally, in such instances, the secretion of milk does not commence for several days after the birth of the child, and occasionally, there is not a drop secreted at any period after delivery, thus depriving the mother, whose heart is in the right place, of that most natural and sacred duty—the nursing her infant.

The mammæ are really annexæ of the generative organs in the female, and, according to the general law, have an important office imposed upon them—the elaboration of food adapted to the wants of the new-born child. Charles Robin has pointed out an extremely interesting fact in reference to the true physiological relations of the mammæ to the uterus during the progress of pregnancy. He has shown that there is a correspondence in the development of the tissues of the uterus, and the glandular culs-de-sac of the mammary organs. These glandular culs-de-sac, in a state of partial atrophy when gestation does not exist, become cognisable, and are lined with their epithelium at the time the fibre-cells of the uterus undergo an increase in volume.

There are numerous causes, other than pregnancy, capable of giving rise to an increase of volume in the breasts. It is quite common for women to suffer more or less from tension of the mammæ at the time of the menstrual turns. In fact, this fulness of the breasts is sometimes the very indication by which the female becomes aware of the approach of her catamenial period. Again: nothing is more common than enlargement of the breasts following suppression of the courses—the same thing occurs, also, in various diseases of the uterus—more especially in cases in which there may be morbid growths, such as polypus, submucous fibrous tumors, hydatids, or other morbid developments.

Milk in the Breasts.—The presence of milk in the breasts is regarded by many as a very important evidence of gestation; but while it is one of the usual accompaniments of pregnancy, it must

not be forgotten that the secretion of milk may take place in various conditions of the system in which impregnation has not occurred. The very mammary sympathies to which we have just alluded, including the secretion of milk, so far from being necessarily due to pregnancy, are, in fact, oftentimes the results of ovarian excitement,* no matter from what cause. Hence, milk will sometimes be secreted in disease of the ovary, and in the various menstrual aberrations. It is a well-established fact, that milk has been recognised in the breasts of young virgins, and also of males. An interesting case is mentioned of a faithful young woman who, in order to quiet the infant of her mistress, was in the habit of applying it to her breast, the consequence of which was a free secretion of milk.

Perhaps one of the most extraordinary examples of this kind on record—and which is regarded as perfectly authentic—is that of a little girl, in France, eight years of age, deaf and dumb, who, by the repeated application to her breast of a young infant which her mother was suckling, had sufficient milk to nourish the child for a month, during which time the mother was unable to nurse it on account of sore nipples. This little girl was exhibited to the Royal Academy of Surgery on the 16th of October, 1783, and had such a quantity of milk that, by simply pressing the breasts, she caused it to flow out in the presence of the Academy; on the same day, she did the same thing at the house of Baudelocque, before a large class of pupils.† The fact may surprise you, but it is well known that virgins, old women, and even men, are often employed as wet-nurses in the Cape de Verde Islands. In the lower animals, milk will occasionally be found in the teats as the mere result of sexual excitement—in some instances, in which coition has taken place without fecundation, and in others, in which the female has become excited without intercourse with the male.‡

* On the 11th of May, 1857, Mrs. R. came to the clinic for professional advice under the following circumstances: She had been married twenty-three years; was forty-two years of age, and her only child was nineteen years old. With the exception of the period of pregnancy and lactation, her courses had always been regular, until about six months before she applied for advice; but she had within these six months become much alarmed from the occasional swelling of one of her breasts; and, on inquiry, it was ascertained that at the time the courses should have appeared, the tumefaction of the breast invariably occurred, and subsided as soon as the catamenial flow took place. There was not the slightest indication of tumor or other disease of the mamma; it was simply an example of what, perhaps, might be properly termed mammary metastasis. The patient was directed to have four leeches applied to each groin a few days before the usual time for the return of the menses, with a view of relieving the ovarian irritation. This simple suggestion had the effect of restoring the function, entirely removing the engorgement of the mamma. I have seen several cases of hypertrophy of the breasts following amenorrhœa, and the hypertrophy has always yielded on the restoration of the menstrual function.

† Baudelocque, *L'Art des Accouchemens*, tom. I., p. 188, in 8v. Paris, 1815.

‡ Harvey, in speaking of bitches which did not conceive after coition, and which,

The Areola.—The next change in the breasts to which I shall allude, as indicative of pregnancy, is the condition of the areola—that peculiar circle which immediately surrounds the nipple. In the virgin, in a normal state, this circle is characterized by a beautiful hue, not unlike the tint of the budding rose. But I have seen it, even in the virgin, under certain conditions of morbid action, change this tint for a discoloration more or less marked; it is essential that you should understand the error, which seems to have been perpetuated by many clever writers respecting the color of the areola. According to them, the color is the principal or characteristic attribute. This, however, is not so, and the sooner the error be corrected and heeded, the better it will be for just opinions. Remember, gentlemen, I am now alluding to what may be denominated the true areola, by which I mean the areola which, when recognised, is, in my opinion, a very solid evidence that gestation exists.

There is no doubt that, under ordinary circumstances, when pregnancy occurs, there is a discoloration of the areola; but as there are other conditions of the system in which this change of color takes place, it is quite evident that there must be some characteristics more reliable in order that a correct diagnosis may be arrived at; in other words, if the areola be worth anything as a test of pregnancy, it must have some marked and peculiar developments dependent exclusively upon gestation; and this is a question which we shall examine presently. Females who are subject to hysteria and the various menstrual aberrations, will occasionally have discoloration of the areola; and I have observed it as by no means an unusual accompaniment of dysmenorrhœa dependent upon chronic inflammation of the ovaries.*

It is worthy of remark that the deposit of coloring matter, both in pregnancy and in undue irritation of the sexual organs, has been observed in other portions of the system than in the areola of the nipple. For example, Blumenbach cites the case of a female peasant, whose abdomen became entirely black during each successive pregnancy; and a very remarkable instance is mentioned by Camper of a woman who, at the commencement of her gestation, began to turn brown, and before its completion, became perfectly black; the discoloration, however, gradually disappeared after the birth

at the time corresponding with the completion of their gestation, if they had been fecundated, appeared to be in great distress, says: "Some of them have milk in their teats, and are obnoxious to the distempers incident to those which have already pupped."

* Besides the change in the color, sometimes observed in dysmenorrhœa and other menstrual aberrations, there are occasionally certain developments characteristic of the areola of pregnancy, such as slight turgescence of the integument, and elevation of the follicles—but these developments are transitory, and disappear as soon as the menstrual excitement ceases.

of her child. These and other instances, seem to prove, to a greater or less extent, a very marked relation between this deposit of black pigment, and excitement of the sexual organs. Again: it is not unusual to observe, around the umbilicus of the pregnant woman, a dark areolar surface; and also a dark, sometimes brown, line extending from the pubes to the umbilicus.

The areola has been studied with great attention by Dr. Montgomery,* of Dublin, and his description of its true characteristics, so far as being the result of pregnancy, is so faithful to nature, that I shall recall to you briefly what he says on the subject. "I cannot," he observes, "say positively what may be the very earliest period at which the changes may be observed, but I have recognised them at the end of the second month, at which time the alteration in color is by no means the most obvious circumstance; but the puffy turgescence (though as yet slight) not alone of the nipple, but of the whole of the surrounding disc, and the development of the little glandular follicles, with the developed state of the mammary veins, are the objects to which we should principally direct our attention; the color, at this period being, in general, little more than a deeper shade of rose, or flesh color, slightly tinged occasionally with a yellowish or light brownish hue. During the progress of the next two or three months, the changes in the areola are in general perfected, or nearly so, and then it presents the following characters: a circle around the nipple whose color varies in intensity, according to the particular complexion of the individual, being usually much darker in persons with black hair, dark eyes, and sallow skin, than in those of fair hair, light-colored eyes, and delicate complexion. The area of this circle varies, in diameter, from an inch to an inch and a half, and increases in most persons as pregnancy advances, as does also the depth of color.

"In the centre of the colored circle, the nipple partakes of the altered color of the part, is turgid and prominent, its apex being more or less covered with little branny scales, produced by the drying of a sero-lactescent fluid which oozes from the part; the surface of the areola, especially that portion of it more immediately around the base of the nipple, is rendered unequal by the glandular follicles, which, varying in number from twelve to twenty, project from the sixteenth to the eighth of an inch; and, lastly, the integument covering the part appears a little raised; emphysematous, turgescient, softer, and more moist than that which surrounds it; while on both, there are, at this period, especially in women of dark hair and eyes, numerous round spots, or small mottled patches of a whitish color, scattered over the outer part

* Signs and Symptoms of Pregnancy. 2d Edition, p. 97.



Seventh month.



AREOLA OF THE BREAST
Eighth month.

of the areola, and for about an inch or more all round, presenting an appearance as if the color had been discharged by a shower of drops falling on the part. Dubois, referring to this appearance, applies to it the designation of secondary areola. This appearance is not recognised earlier than the fifth month, but toward the end of pregnancy is very remarkable, and constitutes a strikingly distinctive character, *exclusively resulting from pregnancy*; the breasts themselves are, at the same time, generally full and firm; and venous trunks of considerable size are seen ramifying over their surface, sending branches toward the disc of the areola; together with these vessels, the breasts not unfrequently exhibit, about the fifth and sixth months, and afterward, a number of shining, whitish, almost silvery lines like cracks; these being most perceptible in women who, having had before conception very little mammary development, exhibit a rapid and marked enlargement on becoming pregnant. When once formed, these lines continue permanent, and, therefore, will not serve as diagnostic marks of a subsequent pregnancy, and sometimes they do not form at all.”*

Such are the essential characters generally belonging to, or connected with, the true areola, the result of pregnancy; and I quite agree in opinion with Dr. Montgomery that when these peculiar features are recognised in the areola, they should be regarded as positive proof of pregnancy, no other condition being capable of producing them. The true areola, I repeat, in my judgment, and this opinion is founded on extended observation, is not recognised except as a consequence of gestation.

The remarkable case which came under the observation of Hunter, it may be well to mention as an instance of his faith in this sign. It was chiefly on the presence of the areola that he founded his opinion of the existence of pregnancy in a young woman, who had been examined after death by his pupils, and in whom there was an intact hymen; and, therefore, the appearance of virginity. In laying open the uterus, it was found that Hunter was right.

Let us for a moment look at the *per contra* of this question. Can pregnancy exist without the development of the true areola? In my opinion it can, and upon the principle of an exception to a very general rule.† I have already remarked to you that some

* See Plates 1, 2, 3, 4, 5, transcribed from Dr. Montgomery's work, and which are most graphic delineations of the areola in the different stages of pregnancy.

† In December, 1856, I received a letter from Dr. H. P. Ferguson, of Western Virginia, who kindly sent me a patient, for advice, who had been under his professional care for some months. The lady was twenty-seven years of age, had been married eight years, but had never borne any children, nor had she ever been pregnant. Her general health had always been good, and her menstrual turns regular,

women will pass through their gestation without the slightest enlargement of their breasts; and you will occasionally meet with cases in which the changes in the areola do not commence their development until the latter months of gestation. It must also be recollected that nursing women, who have recently miscarried, may present the peculiar attributes of the areola; so that it may devolve on you to show, not only that the true areola is absolutely the product of pregnancy, but that the pregnancy of which it is the product, still exists.*

Probable Evidences:

Changes in the Uterus and Abdomen.—You have already been told that, when fecundation takes place, immediate and remarkable

until the June previous to my seeing her. From that time until December, when she first consulted me, her courses had been suppressed; she had most of the ordinary symptoms of pregnancy, except that there was not the slightest change in the breasts, nor any approach to the formation of the areola. This lady had been much annoyed by nausea and vomiting for four months after the menses became suppressed, and her appetite had been remarkably depraved; her abdomen was enlarged corresponding with a six months gestation—and yet the breasts, which had always been small, exhibited not the slightest change in development. The patient observed to me, in reply to my inquiry, that she had not felt any movement in her abdomen; and, although she was most anxious to be a mother, she said she was quite confident she was not pregnant. Dr. Ferguson, in his letter, remarks, "Were it not that the breasts remain unchanged, I should say that Mrs. L. is undoubtedly in gestation; have you ever seen a case of pregnancy unaccompanied by the slightest mammary development?" As this lady was most anxious to have her true situation ascertained, and as she had been rendered very unhappy by the apprehension that her enlarged size was occasioned by the presence of a tumor, which would destroy her life, I proceeded to a very thorough investigation of her case. On a vaginal examination, I soon discovered that the abdominal enlargement was caused by the enlargement of the uterus; applying one hand to the abdomen, with a view of gently grasping the uterus, and the index finger of the other hand placed on the posterior portion of the cervix uteri, with an alternate movement of ascent and descent made with the hands thus applied, I very distinctly felt the passive motion of the foetus, known by the French as the *ballotement*, and sometimes described by the English under the term *repercussion*, to which I shall have occasion hereafter more particularly to allude, when speaking of the vaginal explorations in reference to the diagnosis of pregnancy. So certain and unequivocal do I regard the *ballotement* as proof of gestation, that I at once, without the least qualification, assured the lady she was pregnant. This opinion seemed to give her great pleasure; and she very quietly, but pointedly, asked me, "Whether I would stake my reputation on the opinion I had given." I immediately replied that I was quite content to abide by the revelations of the future, and that she would discover the future would fully indorse my opinion. She left New York January 3d for her home in Virginia, bearing with her a letter to Dr. Ferguson, in which I expressed my positive conviction of her pregnancy; all doubt in her mind was dissipated by the birth of a daughter on the 27th of the following March.

* It will be observed that I have classed the areola among the presumptive evidences of gestation, for the reason that I did not desire to separate it from the consideration of the mammary sympathies. At the same time, I regard the true areola as among the most positive signs of pregnancy.

changes begin to exhibit themselves in the uterus; these modifications we now propose to examine, in order that they may receive their true value as evidences of gestation. It is only necessary to remember the important duties which the uterus is called upon to discharge in the brief period of nine months—the accommodation and nutrition of the growing embryo—to appreciate the urgent necessity there is for marked and rapid alteration both in its structure and functions. Almost simultaneously with the act of fecundation, and even before the product reaches the uterus, this organ becomes the centre, so to speak, of an extraordinary fluxion. This concentration of fluids results necessarily in increase of volume, because of the increase of tissues.

Descent of the Gravid Uterus during the First Two Months.—

Contrary to what might, at first view, be imagined, the tendency of the uterus for the first two months after impregnation is, not to ascend into the abdomen, but to descend into the pelvic cavity; and there are certain phenomena, during the earlier periods of pregnancy, consequent upon this depressed condition of the gravid organ, which it is important to remember:

1. As the direct result of the descent of the uterus, there will be more or less frequent desire on the part of the female to pass water, because of the pressure of the organ on the neck of the bladder;* sometimes, also, there will be a species of tenesmus, more particularly if the pressure of the uterus, instead of falling on the neck of the bladder, should, as sometimes will be the case, be directed against the rectum.

2. It is only necessary for you to refer to what was said, when describing the relations of the pelvic viscera to each other, to understand why an alteration in the position of the uterus must necessarily affect, more or less, the position of the bladder; so that, as the uterus descends into the pelvis, so measurably must the bladder; the effect of this change of position in the latter organ, will be pain at the umbilicus, and a cup-like appearance of the cavity. Sir Charles Clarke claims to have been the first to direct attention to this pain at the umbilicus as a result of procidentia vesicæ, and explains the connexion between cause and effect on very rational grounds. The superior ligament of the bladder, formed by the remains of the two umbilical arteries, extends from the fundus of the organ to the umbilicus; the bladder being prolapsed, the ligament is put upon the stretch, and hence the pain and increased cup-like fossa.†

* This desire for frequent micturition is not exclusively the result of a mechanical cause; it is in part due to reflex influence.

† I am disposed to attach more than ordinary importance to the pain and increased excavation of the umbilicus as early indications of pregnancy, especially if there have previously been no displacement of the uterus or bladder from other

of a pricking or stinging sensation; they are much firmer to the touch, and enjoy a greater degree of mobility. This greater firmness and mobility are not usually observed in the mammæ, when their increase of size is merely dependent upon the accumulation of fatty material. The nipple, in consequence of the tumefaction, is more prominent, and oftentimes painful. The veins, coursing along the breasts, become distended, and can be distinctly traced by the naked eye. The particular period after pregnancy at which these changes occur is variable; sometimes they begin to develop themselves in two or three weeks, sometimes not until the lapse of two or three months, and, in women of delicate constitution, there will oftentimes be little or no change in the size of the mammæ until the latter months of gestation. Indeed, I have seen cases in which, even after delivery, there could be detected not the slightest physical alteration, and generally, in such instances, the secretion of milk does not commence for several days after the birth of the child, and occasionally, there is not a drop secreted at any period after delivery, thus depriving the mother, whose heart is in the right place, of that most natural and sacred duty—the nursing her infant.

The mammæ are really annexæ of the generative organs in the female, and, according to the general law, have an important office imposed upon them—the elaboration of food adapted to the wants of the new-born child. Charles Robin has pointed out an extremely interesting fact in reference to the true physiological relations of the mammæ to the uterus during the progress of pregnancy. He has shown that there is a correspondence in the development of the tissues of the uterus, and the glandular culs-de-sac of the mammary organs. These glandular culs-de-sac, in a state of partial atrophy when gestation does not exist, become cognisable, and are lined with their epithelium at the time the fibre-cells of the uterus undergo an increase in volume.

There are numerous causes, other than pregnancy, capable of giving rise to an increase of volume in the breasts. It is quite common for women to suffer more or less from tension of the mammæ at the time of the menstrual turns. In fact, this fulness of the breasts is sometimes the very indication by which the female becomes aware of the approach of her catamenial period. Again: nothing is more common than enlargement of the breasts following suppression of the courses—the same thing occurs, also, in various diseases of the uterus—more especially in cases in which there may be morbid growths, such as polypus, submucous fibrous tumors, hydatids, or other morbid developments.

Milk in the Breasts.—The presence of milk in the breasts is regarded by many as a very important evidence of gestation; but while it is one of the usual accompaniments of pregnancy, it must

development, the fundus of the uterus emerges from the pelvis, and is recognised above the superior strait, imparting to the touch the sensation of a round resisting tumor, occupying the lower and central portion of the hypogastric region. It will, however, require some tact and nicety of manipulation to detect the organ at this early period through the abdominal walls, especially in a primipara, and in women with much adipose or fatty matter. As soon as the gravid womb has left the pelvic cavity, and fairly entered the abdomen, the direction which it then pursues is altogether changed; it now follows a line parallel, or nearly so, to the axis of the superior strait; consequently, its course is upward and forward; and this alteration in its direction necessarily produces a change in the position of its cervix, which becomes slightly elevated, and instead of inclining forward, looks backward, and frequently a little to the left. You perceive that, as the uterus pursues the axis of the superior strait, it receives a point of support from the abdominal walls, the direct consequence of which is, that the pressure exercised posteriorly by the gravid organ on the aorta, ascending vena cava, ureters, and upper portion of the rectum, is much diminished.

Right Lateral Obliquity.—It is an interesting fact to note that, in the great majority of cases, the gravid uterus, after leaving the pelvis, becomes slightly oblique to the right in its long axis, constituting what is known as the right lateral obliquity; and various theories have been suggested to account for the circumstance. Some, with Levret, have imagined that it was due to the insertion of the placenta on the right lateral half of the fundus uteri; but in order to make this explanation satisfactory, proof is required that, in all cases of this species of obliquity, the placenta is actually in adhesion at this particular point of the organ; this proof cannot be furnished, for it is directly adverse to facts, and, therefore, the theory is without a basis. Madame Boivin thinks that the obliquity is owing to the shortness, greater muscularity, and strength of the round ligament on the right side. I have, myself, never been able to detect any difference in the length or structure of the two round ligaments, although I have had an opportunity of examining a large number in autopsies. Again: it has been attempted to show that the more frequent use of the right arm, and the greater disposition to recline on the right side, give rise to this obliquity of the organ. But this is not sustained by facts. Without alluding further to the various opinions of writers, allow me to observe that, although, perhaps, difficult satisfactorily to explain, yet the fact itself is interesting and important to be remembered.

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is not unusual for the pregnant female to complain at the fifth or sixth month of pain in the right side; this is often occasioned by pressure of the ascending uterus against the liver. I have generally been enabled to palliate the pain with an occasional mercurial pill, followed by a saline draught. It will usually, however, be more or less annoying until the birth of the child.

At the sixth month (Fig. 41), the fundus is two fingers' breadth



FIG. 41.
Sixth month of gestation.



FIG. 42.
Ninth month of gestation.

above the umbilicus; and, at this period, the latter becomes partly inverted with a partial disappearance of its cup-like fossa, and forms a slight prominence. This peculiar appearance of the umbilicus is worthy of recollection; it has, under ordinary circumstances, some value as a sign of pregnancy, although I have seen it as the mere result of abdominal tumors and advanced ascites.

At the seventh month, the fundus has reached midway between the umbilicus and the curve of the stomach; at this time the umbilical fossa has completely disappeared, and the umbilicus itself, in consequence of its inversion, forms a marked projection. The cervix is still more elevated and inclined posteriorly.

At the eighth month, the fundus of the organ is high up in the epigastric region. There is now great prominence of the abdomen, with more or less oppression in breathing, in consequence of the pressure of the ascending uterus against the diaphragm; and it is not unusual for the woman to be troubled more or less with a cough

and palpitation of the heart. It is just as well for you to remember in this connexion, that the cough is unaccompanied with fever or an excited pulse; it is not the cough of inflammatory action. It, like the palpitation, is simply the result of the mechanical irritation experienced by the lungs and heart, in consequence of the greater elevation of the diaphragm, thus curtailing the usual capacity of the chest. I speak of this in order that you may not, through erroneous diagnosis, subject your patient, for this cough and palpitation, which will yield as soon as the pressure is removed from the diaphragm, to the absurdity of antiphlogistic treatment.*

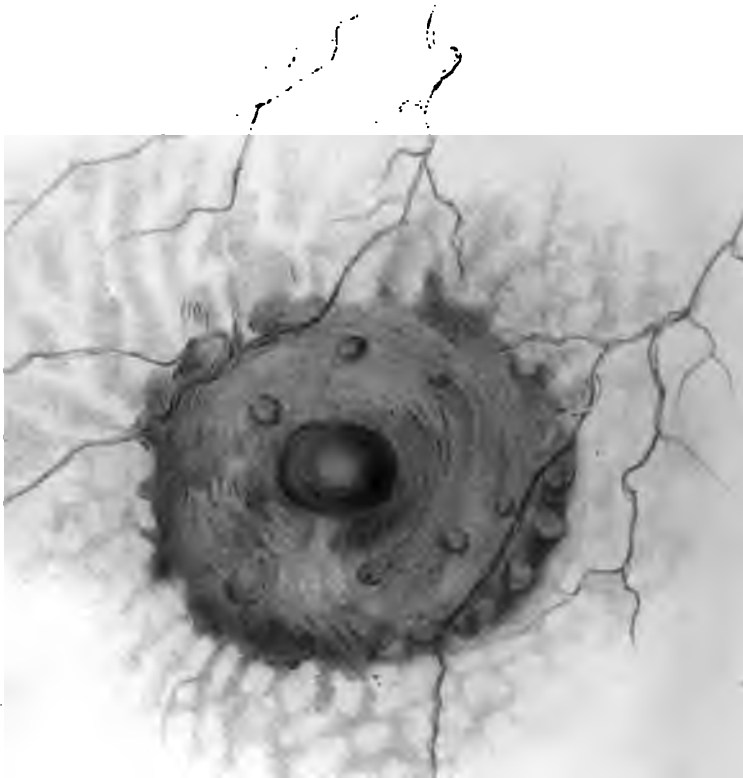
Toward the close of the ninth month (Fig. 42), the uterus descends into the pelvic excavation, and, as a consequence, there will be more or less vesical irritation, and sometimes a feeling of tenesmus occasioned, in the former instance, by the pressure of the organ against the neck of the bladder, and, in the latter, against the rectum. But this descent of the uterus, at the close of the ninth month, is followed by a circumstance which should not be forgotten; I mean a diminished prominence of the abdomen, which will sometimes give rise to the apprehension, on the part of the female, that something is wrong; that she is not pregnant, or that her fœtus is dead. Again: In consequence of the settling down of the gravid womb, the pressure is removed from the diaphragm, and, hence, the respiration is freer, the cough disappears, and the patient experiences a buoyancy of spirits, forming a striking contrast with the oppression of the previous few weeks; this she cannot account for, but which you, knowing the cause of the change, can readily appreciate.

Why does the impregnated uterus descend toward the end of the ninth month? May it not be that, at this period, the organ increases in its transverse diameter, and, at the same time, diminishes in length? But, gentlemen, if you ask me whether the descent of the organ at this period be necessary, whether there be any special benefit derived, I ask you, in return, to reflect, for a moment, on the important work in which nature is so soon to become engaged, viz. the expulsion of the fœtus from the maternal organs. The object, therefore, of this change in the uterus, is directly connected with the birth of the child; it is, as it were, one of the arrangements preliminary and essential to the important act of labor.

These various changes in the position of the uterus, to which we

* Although it is true that these derangements in the respiratory organs, at the latter period of gestation, are usually traceable to the ascent of the diaphragm; yet it must be recollected that these phenomena will sometimes develop themselves at a less advanced period of pregnancy, and here the dyspnoea, cough, etc., may be due to a nervous, or a congested condition of the lung (possibly to œdema of the organ); the therapeutic indication will depend upon the special cause; for example, if it be traced to nervousness, hyoscyamus, thirty or forty drops of the tincture; or if to congestion, the judicious intervention of the lancet.

PLATE IV



AREOLA OF THE BREAST
Ninth month

PLATE A



have thus briefly alluded, are liable to certain modifications. For example, in a multipara—a female who has borne several children—the uterus in its ascent usually does not reach as high up in the abdomen in the latter periods of pregnancy as in a primipara; and, at the same time, the abdomen is much more protuberant. These two circumstances arise from the fact, that previous pregnancies having so distended and relaxed the abdominal walls, the gravid womb, encountering but little resistance as it passes upward, has a strong tendency to fall forward, constituting a species of anteversion of the organ; whereas, in the primipara, its direction is more in accordance with the axis of the superior strait of the pelvis. In a first pregnancy, the parietes of the abdomen undergo extraordinary distension, and consequently become thin; occasionally, there is a separation of the two recti muscles; and you will remember an interesting case, in the clinic, of a female, who, having been confined with twins, was afterwards much annoyed by the protrusion of the intestines through the space left by the separation of these muscles.*

Change in the Direction of the Urethra.—When the gravid uterus leaves the pelvic cavity, and during its progress in the abdomen, very important changes are effected in the position of the bladder and urethra; the ascent of the uterus necessarily occasions the ascent of the bladder, which, of course, draws up the urethra in such a way that, instead of occupying an oblique position, as it does under ordinary circumstances, it becomes more and more vertical, so that, in the latter periods of gestation, it will be found almost parallel with the internal surface of the symphysis—a most important fact to be recollected in connexion with the introduction of the catheter, ignorance of which will oftentimes lead to results mortifying to the practitioner, and disastrous to the patient. The superior portion of the urethra will sometimes be so greatly pressed upon by the gravid uterus, that its lower extremity, in consequence of the impeded circulation, will become very much engorged, thus giving rise to an enlargement, which, if not understood, might result in erroneous conclusions. This condition of the excretory duct is not unusual, particularly in first pregnancies, and arises simply from mechanical obstruction in the blood-vessels. It is of no special import, except that without this explanation you might possibly, in making a vaginal examination, misapprehend the nature of the enlargement, and suppose it to be a foreign growth.

Edema of Lower Extremities.—The œdema of the lower extremities, as an ordinary accompaniment of gestation, amounting sometimes to a fully developed anasarca, is also explained in the

* See Diseases of Women and Children, p. 211.

same way ; that is, obstruction, from pressure of the impregnated womb, in the venous circulation,* thus preventing the free passage of blood from the lower extremities to the ascending cava, and thence to the right cavities of the heart. In the same manner also, do you account in part for the appearance of hemorrhoidal tumors, so common in pregnancy ; I say in part, for they are likewise due to the constipation, which is the usual accompaniment of this condition ; the constipation very frequently arising from the pressure of the uterus against the upper portion of the rectum. You have seen in the clinic several examples of enlargement of the veins in the vagina, traceable to the presence of various kinds of abdominal tumors ; and you have been told that these venous engorgements are simply the result of obstructed circulation. In pregnancy, also, you will occasionally meet with the same phenomena ; and I have known, under these circumstances, thrombus of the vulva, to produce fearful hemorrhage. In the latter contingency, the great remedy is well directed pressure by means of pieces of sponge.†

* There are other causes than obstruction in the venous circulation, which may occasionally produce oedema, or dropsy of the cellular tissue, during pregnancy ; for example, organic disease of the heart, the existence of albuminuria, anemia, etc.

† For an interesting case of thrombus of the vagina, together with its treatment, see *Diseases of Women and Children*, p. 463.

LECTURE XI.

Evidences of Pregnancy continued—The Effect of Fecundation on Development of Uterus—Order of Development—Fundus enlarges first three Months—Body from third to sixth Month—Wisdom of this Arrangement—Shape of Impregnated Uterus—Modifications of Cervix in Pregnancy—Error of certain Authors—Uterine and Vaginal Extremities of Cervix—Cervical Canal—Relaxation of Tissues of Cervix—Cervix does not Lengthen—Error of Madame Boivin—Prominence of Os Tincæ—Softening and Moisture—Mucous Follicles—Development of—Increased Mucous Secretion not a Pathological State—Uses of this Secretion—Cervix begins to shorten at its Uterine, and not at the Vaginal Extremity—Proof—Opinions of Stoltz and Cazeaux—Placenta Prævia and Shortening of Cervix—Modifications of Cervix in Primipara and Multipara—Increased Development of Uterine Appendages in Pregnancy—How does the Cavity of the Uterus enlarge?—Ancient Theory—Increased Nutrition the true Cause—Thickness of Uterine Walls; Opinions respecting—Os Uteri at Time of Labor—Discoloration of Vagina as a sign of Pregnancy—Is this Discoloration peculiar to Pregnancy?

GENTLEMEN—From the instant of fecundation until the accomplishment of the full term of utero-gestation, the womb is constantly undergoing the process of development; this increase of tissue and capacity is in accordance with the growth of the embryo. In one word, the exclusive and only object of these changes is to provide accommodation and sustenance to the growing germ. But the development of the gravid organ is not without order; in the arrangement, which nature has instituted for the successive increase in the volume and structure of the uterus, the obstetrician will find much of interest. The increase in the size of the organ, although successive, is not uniform; as an evidence of this fact, the growth of the uterus for the first three months is principally through the development of its fundus; the body of the organ undergoes striking changes from the third to the sixth month; while it is not until the three last months of gestation that the cervix or neck contributes its share to the general accommodation of the embryo.

You cannot, gentlemen, fail to perceive the wisdom of this order in the successive developments of the impregnated uterus; it is essentially conservative, and for the protection of both mother and child. Suppose, for illustration, the order were reversed; and, instead of the fundus, the cervix should be the first to undergo the physical changes necessary for the requirements of the growing fœtus. Do you not perceive, at once, the inevitable results of such

Together with these peculiarities, which usually accompany early pregnancy, there is a condition of the abdomen at this period well worthy of attention. One would very naturally suppose that, as soon as the impregnated uterus began to increase in bulk, there would necessarily be a corresponding development and prominence of the abdomen. But this is not so; for the first two months after fecundation, the abdomen, so far from becoming prominent, actually recedes, and presents in the hypogastric region the aspect of flatness. This fact had been well observed by the early writers, and hence the ancient aphorism *ventre plat, enfant il y a*—a flat belly denotes pregnancy. On the contrary, about the third month there is oftentimes quite a prominence of the hypogastric region, which, in a short time, becomes measurably lessened, and hence, a woman who is really pregnant may suppose that she is not so, for the reason that at the fourth month she will frequently be smaller than at the third.

It is important that you should comprehend the cause of this difference. At the third month, just as the gravid uterus begins to leave the pelvic excavation, it is not at all unusual for the small intestines, which rest, as it were, upon the fundus of the organ, to become more or less distended with flatus, and it is owing to this circumstance that the greater volume of the abdomen is due; as, however, the period of the fourth month approaches, this distended condition of the intestines disappears. What is it that produces the flatulent state of the bowels at the third month? May it not be due, in the first place, to the irritation experienced by the ganglionic nerves of the uterus, and thus transmitted to the chylopoietic viscera; and, secondly, to a reflex influence occasioned by the physical changes going on in the uterus itself? I am inclined to think that this is the explanation; but you may urge the objection, if these causes should occasion the collection of flatus at the third month, why should they not also, *à fortiori*, occasion it during the entire period of the subsequent pregnancy? I answer that it is probably because the digestive mechanism becomes in a short time accustomed to these combined influences, and ceases as a consequence to suffer any derangement. Be the explanation satisfactory or otherwise, the fact is worthy of recollection.

Positions of the Gravid Uterus.—Let us now recall to memory the various positions of the impregnated uterus from the earliest moment of conception until the completion of the full period of gestation. These gradual changes of position it is absolutely necessary for you accurately to comprehend, for they have a very important bearing, not only on the question of whether pregnancy

causes; for it must be recollected that, in prolapsion of either of these viscera, altogether unconnected with gestation, the umbilicus will usually undergo the same changes as in pregnancy.

exists, but also as to the particular period of the gestation itself. For the first three months, the impregnated organ is confined within the limits of the pelvic excavation; this is the general rule, but there are occasionally exceptions to it. The uterus, while lodged in the pelvic cavity, continues to grow and increase in size, and has a tendency to incline toward the hollow of the sacrum, which will consequently cause the cervix to diverge slightly forward from the centre of the excavation; and at the same time, because of the ordinary position of the rectum to the left, the fun-



FIG. 39.
Natural state.

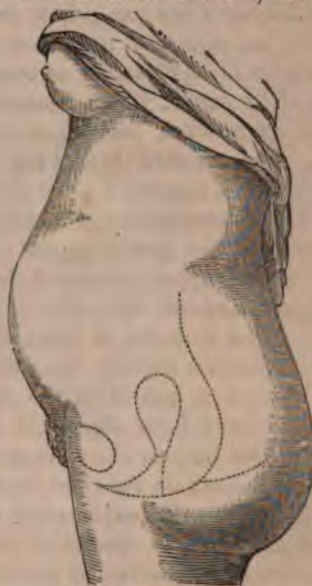


FIG. 40.
Third month of gestation.

dus and body of the organ are pushed to the right, which will necessarily induce a deviation of the cervix slightly toward the left of the pelvic excavation. Thus, you perceive, gentlemen, that, for the first three months after impregnation, for the reasons just stated, the direction of the neck of the uterus presents three peculiarities, viz. downward, forward, and slightly to the left. I have repeatedly remarked, especially in a first pregnancy, that the patient would complain, in the earlier periods of gestation, of a sense of numbness and darting pains in the lower extremities; and you see how easy it is to account for these phenomena—the sacral plexus of nerves, situated in the cavity of the sacrum, becomes, from the pressure of the uterus, more or less irritated, and this irritation is immediately transmitted to the great ischiatic and its tributaries, and hence the feeling of numbness and pain.

At the third month (Fig. 40), in consequence of its progressive

development, the fundus of the uterus emerges from the pelvis, and is recognised above the superior strait, imparting to the touch the sensation of a round resisting tumor, occupying the lower and central portion of the hypogastric region. It will, however, require some tact and nicety of manipulation to detect the organ at this early period through the abdominal walls, especially in a primipara, and in women with much adipose or fatty matter. As soon as the gravid womb has left the pelvic cavity, and fairly entered the abdomen, the direction which it then pursues is altogether changed; it now follows a line parallel, or nearly so, to the axis of the superior strait; consequently, its course is upward and forward; and this alteration in its direction necessarily produces a change in the position of its cervix, which becomes slightly elevated, and instead of inclining forward, looks backward, and frequently a little to the left. You perceive that, as the uterus pursues the axis of the superior strait, it receives a point of support from the abdominal walls, the direct consequence of which is, that the pressure exercised posteriorly by the gravid organ on the aorta, ascending vena cava, ureters, and upper portion of the rectum, is much diminished.

Right Lateral Obliquity.—It is an interesting fact to note that, in the great majority of cases, the gravid uterus, after leaving the pelvis, becomes slightly oblique to the right in its long axis, constituting what is known as the right lateral obliquity; and various theories have been suggested to account for the circumstance. Some, with Levret, have imagined that it was due to the insertion of the placenta on the right lateral half of the fundus uteri; but in order to make this explanation satisfactory, proof is required that, in all cases of this species of obliquity, the placenta is actually in adhesion at this particular point of the organ; this proof cannot be furnished, for it is directly adverse to facts, and, therefore, the theory is without a basis. Madame Boivin thinks that the obliquity is owing to the shortness, greater muscularity, and strength of the round ligament on the right side. I have, myself, never been able to detect any difference in the length or structure of the two round ligaments, although I have had an opportunity of examining a large number in autopsies. Again: it has been attempted to show that the more frequent use of the right arm, and the greater disposition to recline on the right side, give rise to this obliquity of the organ. But this is not sustained by facts. Without alluding further to the various opinions of writers, allow me to observe that, although, perhaps, difficult satisfactorily to explain, yet the fact itself is interesting and important to be remembered.

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At the fifth, it is on a level with the umbilicus; at this time the cervix is still higher in the pelvis, and inclined more backward. It

is not unusual for the pregnant female to complain at the fifth or sixth month of pain in the right side; this is often occasioned by pressure of the ascending uterus against the liver. I have generally been enabled to palliate the pain with an occasional mercurial pill, followed by a saline draught. It will usually, however, be more or less annoying until the birth of the child.

At the sixth month (Fig. 41), the fundus is two fingers' breadth



FIG. 41.
Sixth month of gestation.

FIG. 42.
Ninth month of gestation.

above the umbilicus; and, at this period, the latter becomes partly inverted with a partial disappearance of its cup-like fossa, and forms a slight prominence. This peculiar appearance of the umbilicus is worthy of recollection; it has, under ordinary circumstances, some value as a sign of pregnancy, although I have seen it as the mere result of abdominal tumors and advanced ascites.

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At the eighth month, the fundus of the organ is high up in the epigastric region. There is now great prominence of the abdomen, with more or less oppression in breathing, in consequence of the pressure of the ascending uterus against the diaphragm; and it is not unusual for the woman to be troubled more or less with a cough

and palpitation of the heart. It is just as well for you to remember in this connexion, that the cough is unaccompanied with fever or an excited pulse; it is not the cough of inflammatory action. It, like the palpitation, is simply the result of the mechanical irritation experienced by the lungs and heart, in consequence of the greater elevation of the diaphragm, thus curtailing the usual capacity of the chest. I speak of this in order that you may not, through erroneous diagnosis, subject your patient, for this cough and palpitation, which will yield as soon as the pressure is removed from the diaphragm, to the absurdity of antiphlogistic treatment.*

Toward the close of the ninth month (Fig. 42), the uterus descends into the pelvic excavation, and, as a consequence, there will be more or less vesical irritation, and sometimes a feeling of tenesmus occasioned, in the former instance, by the pressure of the organ against the neck of the bladder, and, in the latter, against the rectum. But this descent of the uterus, at the close of the ninth month, is followed by a circumstance which should not be forgotten; I mean a diminished prominence of the abdomen, which will sometimes give rise to the apprehension, on the part of the female, that something is wrong; that she is not pregnant, or that her fœtus is dead. Again: In consequence of the settling down of the gravid womb, the pressure is removed from the diaphragm, and, hence, the respiration is freer, the cough disappears, and the patient experiences a buoyancy of spirits, forming a striking contrast with the oppression of the previous few weeks; this she cannot account for, but which you, knowing the cause of the change, can readily appreciate.

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These various changes in the position of the uterus, to which we

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PLATE IV



AREOLA OF THE BREAST

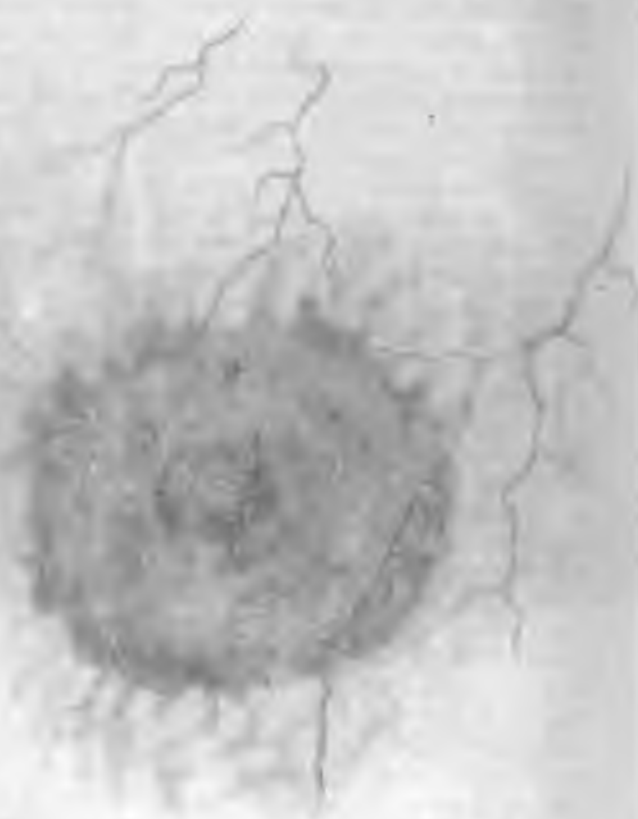
Ninth month

have thus briefly alluded, are liable to certain modifications. For example, in a multipara—a female who has borne several children—the uterus in its ascent usually does not reach as high up in the abdomen in the latter periods of pregnancy as in a primipara; and, at the same time, the abdomen is much more protuberant. These two circumstances arise from the fact, that previous pregnancies having so distended and relaxed the abdominal walls, the gravid womb, encountering but little resistance as it passes upward, has a strong tendency to fall forward, constituting a species of anteversion of the organ; whereas, in the primipara, its direction is more in accordance with the axis of the superior strait of the pelvis. In a first pregnancy, the parietes of the abdomen undergo extraordinary distension, and consequently become thin; occasionally, there is a separation of the two recti muscles; and you will remember an interesting case, in the clinic, of a female, who, having been confined with twins, was afterwards much annoyed by the protrusion of the intestines through the space left by the separation of these muscles.*

Change in the Direction of the Urethra.—When the gravid uterus leaves the pelvic cavity, and during its progress in the abdomen, very important changes are effected in the position of the bladder and urethra; the ascent of the uterus necessarily occasions the ascent of the bladder, which, of course, draws up the urethra in such a way that, instead of occupying an oblique position, as it does under ordinary circumstances, it becomes more and more vertical, so that, in the latter periods of gestation, it will be found almost parallel with the internal surface of the symphysis—a most important fact to be recollected in connexion with the introduction of the catheter, ignorance of which will oftentimes lead to results mortifying to the practitioner, and disastrous to the patient. The superior portion of the urethra will sometimes be so greatly pressed upon by the gravid uterus, that its lower extremity, in consequence of the impeded circulation, will become very much engorged, thus giving rise to an enlargement, which, if not understood, might result in erroneous conclusions. This condition of the excretory duct is not unusual, particularly in first pregnancies, and arises simply from mechanical obstruction in the blood-vessels. It is of no special import, except that without this explanation you might possibly, in making a vaginal examination, misapprehend the nature of the enlargement, and suppose it to be a foreign growth.

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AREOLA OF THE BREAST.

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Œdema of Lower Extremities.—The œdema of the lower extremities, as an ordinary accompaniment of gestation, amounting sometimes to a fully developed anasarca, is also explained in the

* See Diseases of Women and Children, p. 211.

same way ; that is, obstruction, from pressure of the impregnated womb, in the venous circulation,* thus preventing the free passage of blood from the lower extremities to the ascending cava, and thence to the right cavities of the heart. In the same manner also, do you account in part for the appearance of hemorrhoidal tumors, so common in pregnancy ; I say in part, for they are likewise due to the constipation, which is the usual accompaniment of this condition ; the constipation very frequently arising from the pressure of the uterus against the upper portion of the rectum. You have seen in the clinic several examples of enlargement of the veins in the vagina, traceable to the presence of various kinds of abdominal tumors ; and you have been told that these venous engorgements are simply the result of obstructed circulation. In pregnancy, also, you will occasionally meet with the same phenomena ; and I have known, under these circumstances, thrombus of the vulva, to produce fearful hemorrhage. In the latter contingency, the great remedy is well directed pressure by means of pieces of sponge.†

* There are other causes than obstruction in the venous circulation, which may occasionally produce œdema, or dropsy of the cellular tissue, during pregnancy ; for example, organic disease of the heart, the existence of albuminuria, anæmia, etc.

† For an interesting case of thrombus of the vagina, together with its treatment, see *Diseases of Women and Children*, p. 463.

LECTURE XI.

Evidences of Pregnancy continued—The Effect of Fecundation on Development of Uterus—Order of Development—Fundus enlarges first three Months—Body from third to sixth Month—Wisdom of this Arrangement—Shape of Impregnated Uterus—Modifications of Cervix in Pregnancy—Error of certain Authors—Uterine and Vaginal Extremities of Cervix—Cervical Canal—Relaxation of Tissues of Cervix—Cervix does not Lengthen—Error of Madame Boivin—Prominence of Os Tincæ—Softening and Moisture—Mucous Follicles—Development of—Increased Mucous Secretion not a Pathological State—Uses of this Secretion—Cervix begins to shorten at its Uterine, and not at the Vaginal Extremity—Proof—Opinions of Stoltz and Cazeaux—Placenta Prævia and Shortening of Cervix—Modifications of Cervix in Primipara and Multipara—Increased Development of Uterine Appendages in Pregnancy—How does the Cavity of the Uterus enlarge?—Ancient Theory—Increased Nutrition the true Cause—Thickness of Uterine Walls; Opinions respecting—Os Uteri at Time of Labor—Discoloration of Vagina as a sign of Pregnancy—Is this Discoloration peculiar to Pregnancy?

GENTLEMEN—From the instant of fecundation until the accomplishment of the full term of utero-gestation, the womb is constantly undergoing the process of development; this increase of tissue and capacity is in accordance with the growth of the embryo. In one word, the exclusive and only object of these changes is to provide accommodation and sustenance to the growing germ. But the development of the gravid organ is not without order; in the arrangement, which nature has instituted for the successive increase in the volume and structure of the uterus, the obstetrician will find much of interest. The increase in the size of the organ, although successive, is not uniform; as an evidence of this fact, the growth of the uterus for the first three months is principally through the development of its fundus; the body of the organ undergoes striking changes from the third to the sixth month; while it is not until the three last months of gestation that the cervix or neck contributes its share to the general accommodation of the embryo.

You cannot, gentlemen, fail to perceive the wisdom of this order in the successive developments of the impregnated uterus; it is essentially conservative, and for the protection of both mother and child. Suppose, for illustration, the order were reversed; and, instead of the fundus, the cervix should be the first to undergo the physical changes necessary for the requirements of the growing fœtus. Do you not perceive, at once, the inevitable results of such

an arrangement—premature delivery, and the consequent destruction of the germ? But nature, in this, as in all her other operations, is constantly disclosing to her disciples motive for every act she performs. For the first six months of gestation, in consequence of the increased volume of the uterus being caused chiefly by the enlargement of the fundus and body only, the organ presents a peculiar shape which has not been inaptly compared to that of a gourd or bottle; after this period, as the cervix begins to shorten, the form of the uterus becomes more ovoid.

Changes in the Cervix.—You will find, in reading the various works on midwifery, that most writers have alluded to the modifications of the neck of the uterus during pregnancy; but there is more or less discrepancy of opinion as to two important circumstances connected with these modifications: 1. The degree of value to be attached to them so far as being guides in the diagnosis of the particular period of gestation; 2. The manner in which the cervix commences and continues to shorten. I propose briefly to examine these questions, and to give to each of them, as far as I may be able to do so, its true bedside importance; for, after all, gentlemen, these questions, so practical in their bearing, must be decided by the revelations of the clinical room. In order that you may have a comprehensive and accurate idea of the phases through which the cervix of the uterus passes during the entire period of pregnancy, I shall divide it into three portions: 1. The lower or vaginal extremity; 2. The upper or uterine extremity; 3. Its canal, being bounded respectively by these two extremities.

Your attention has already been drawn to the important fact that fecundation constitutes the uterus an active centre; this very centralization of forces, if I may so define it, toward the organ, imparts to its physical condition a very rapid and remarkable change, and the most palpable appreciation of the nature and extent of this change will be had by comparing the impregnated organ of a primipara with the uterus of the matured but virgin female. In the latter, the organ presents a dense, resisting, and, to all external appearances, homogeneous structure, it being impossible to discern distinctly with the naked eye any of the elements forming the components of the different tissues. Indeed, it may be said with all truth, that so far as its physical nature is concerned, the characteristic of the virgin womb is *compactness*; while, with equal propriety, it may be affirmed, that the characteristic of the impregnated organ is *softening* or *looseness* of structure, which is the direct result of the fluxion, of which it becomes so active a centre; so that, in the earlier periods of gestation, the increase in the volume of the uterus is to be attributed, not only to new formations, but to the relaxing and spreading out, through the agency of increased circulation, of its pre-existing elements.

For the first six months of utero-gestation, the modifications in the cervix are more or less confined to a softening, and consequent increase in volume of its two extremities and canal; and it is not until the beginning of the seventh month that there is any perceptible shortening of the cervical portion of the organ, as we shall presently endeavor more particularly to show. Madame Boivin, a woman of extraordinary cleverness, and whose field for practical observation was vast, put forth the idea that, at the second month of pregnancy, the cervix uteri is so much increased in length that it measures two inches; this opinion has been more or less adopted by her successors, more, I imagine, from the weight of her authority, than from any conviction founded on actual investigation, that the opinion is correct. I must confess I am somewhat surprised that Madame Boivin should have promulgated such a statement—accurate as she generally is in her deductions—for, as far as I have been enabled to test the point, from no limited observation, it is not in accordance with facts. Can it possibly be that this distinguished woman may, for the moment, have forgotten that the tendency of the impregnated uterus is, for the first two months, to descend into the pelvic excavation, and thus have confounded this descent of the organ with the supposed elongation of its cervix? Or is it that she may have mistaken a congenital elongation for what she imagined to be a lengthening, the consequence of early gestation? Be it as it may, I am quite certain that the cervix does not increase in length during any period of pregnancy.†

One of the very first changes observed by the vigilant accoucheur, as connected with the general softening of its structure, will be a slight tumefaction of the anterior and posterior lips of the os tincæ, and at the same time the orifice begins to lose its transverse shape, and becomes more circular; this latter condition is in part owing to the increase in volume of the two lips, and also to the circumstance that the anterior lip now becomes more protuberant, so that the two lips are equal in size and prominence.

But there is another circumstance connected with the condition of the os tincæ at this period of gestation, which becomes more marked as pregnancy advances; as far as I know, it has not been mentioned in connexion with the modifications of the cervix at the commencement of gestation. *I allude to a peculiar moisture of the two lips, which, according to my experience, is a constant accom-*

* The neck of the uterus will sometimes exhibit an elongation from simple hypertrophy of the part, giving rise to prolapsus, etc. M. Huguier has recently written an exceedingly interesting memoir on this subject, entitled, "Allongements Hypertrophiques du col de l'Uterus." [Mémoires de l'Académie Impériale de Médecine, vol. xxiii. p. 279.]

† Dr. Matthews Duncan is also of opinion that there is rather an elongation of the cervix in the early period of utero-gestation. [Edinburgh Med. Jour., March, 1859.]

pointment of pregnancy. The moisture is occasioned by the pouring out of mucus, which is nothing more than the necessary result of an increase in the size of the mucous follicles, which you are aware are found in more or less abundance, on the internal surface of the cervix. You are not to mistake this secretion of mucus for a morbid or pathological state of the parts—it is in every way a natural and healthy function, and during the entire progress of gestation, is intended to subserve a most important purpose. Let us examine this point for a moment. After the full development of the fetus has been accomplished, and it is sufficiently matured in its physical organization to enable it to live independently of its parent, a new train of phenomena is instituted, the object of which is to secure its safe expulsion from the maternal system. Now, in this expulsion, the sexual organs must of necessity be subjected to extraordinary distension, and the os uteri become amply dilated; the walls of the vagina are pulled upon to contribute largely, and so are the labia. Nature, with consummate forethought, and a provident arrangement worthy of our profound admiration, has taken good care to prepare these organs for the great work of distension.

The mucous follicles, so abundant in the cervix uteri and vagina, are the instruments which she brings to her aid. As pregnancy advances, these follicles become more and more developed, and in proportion to their development will be the secretion of mucus. This very mucus serves to moisten and relax the parts, and thus prepares them for the excessive distension to which they are soon to be subjected. In the latter months of gestation, the mucus is apt to become so abundant as to cause the female to imagine that she has that vague and unmeaning disease the “whites.”* She sends for her medical man, and begs him to give her something to arrest this discharge. If the practitioner be guided by the declarations of his patient—if he should have no mind of his own—or if, in a word, he should not at once perceive that this mucous secretion, in lieu of constituting a pathological condition, is simply one of the wise provisions intended for the successful accomplishment of certain ends, he would most likely prescribe some astringent injection, the tendency of which would be to arrest the discharge, and thus come in direct conflict with the purposes of nature. So you see, gentlemen, how essential it is to distinguish between healthy and morbid phenomena.†

Shortening of the Cervix.—At the same time that these changes are going on in the two lips, there is a progressive increase in the

* See Diseases of Women and Children, “Leucorrhœa,” p. 408.

‡ Reserving the caution suggested, yet it is proper also to recollect that the os uteri may, under certain circumstances, be affected with a morbid distension, which will need attention.

volume of the cervical canal, the tissues of which not only become softer, but there is also an augmented capacity in the canal itself. I cannot but think that authors have labored under a remarkable error in stating the mode and degrees of shortening, which the neck of the uterus undergoes during the various periods of pregnancy. It is maintained by many that, at the fifth month, it loses one-third of its length, at the sixth, one-half, two-thirds at the seventh, three-fourths at the eighth, with an entire obliteration at the end of the ninth month. I believe this error is partly traceable to the circumstance that sufficient importance has not been attached to the fact that the cervix, as one of the immediate results of gestation, becomes increased in volume, and this increase of volume is mistaken oftentimes for a diminution of its length.

As far as I have been enabled to arrive at a just conclusion upon the subject—and no little attention has been given to the investigation—I do not think there is any actual loss in the length of the cervix until near the end of the sixth month, and this brings us to the consideration of the manner in which the shortening is accomplished. You have already been informed that the order of development of the gravid uterus is first an enlargement of the fundus, then of the body, and lastly of the cervix; and it is not until toward the termination of the sixth month that the cervix begins to contribute its share to the general capacity of the uterus. At this time, the uterine portion of the neck commences to widen, from which there are two direct results: 1. A shortening of its long axis; 2. An increase in the uterine cavity.

This expansion of the uterine extremity of the cervix now proceeds with more or less uniformity, producing consequently a gradual shortening of the cervix, and at the same time a gradual increase in the capacity of the uterus, so that, at the end of the ninth month, the cervix has so completely surrendered its length, that it presents simply a ring, which is known in obstetric language as its obliteration. If you examine a female in the fifth month of her gestation, on introducing your index finger into the vagina—in the manner we shall hereafter point out—and passing it along the outer surface of the cervix uteri, you will very readily ascertain that its length is unchanged; make this same examination at the seventh month, and, when your finger reaches the uterine portion of the neck, you will at once recognise a remarkable alteration in the condition of things, viz. that this portion of the organ is more expanded, giving an increase to its various diameters, and then it is that you will also appreciate the important circumstance that the cervix commences to diminish in length, this diminution, remember, beginning *above*, and not *below*—or, to be more explicit at the *uterine*, and not at the *vaginal* extremity of the part.

I am thus emphatic upon this point for the reason that a high authority in midwifery, the learned Stoltz, of Strasburg, maintains that the cervical portion of the uterus begins to lose its length from below upward, and positively asserts that the uterine extremity undergoes no change until the latter part of the ninth month. This opinion of the distinguished professor is also participated in by Cazeaux, who, as a writer and observer, occupies deservedly a high position.* I cannot account for the opinion of these distinguished writers. I am confident it is founded in error, and is altogether adverse to bedside experience. If I did not feel the strongest conviction—a conviction amply confirmed by repeated investigation—that I am right in regard to this question, it would be with no little hesitation that I should thus unequivocally, but yet most respectfully, doubt an opinion emanating from such valued authority.

There is, in my judgment, a very essential practical fact connected with the manner of the shortening of the cervix; and it is strange that attention has not been more specially called to it, for it embodies a lesson of great value to the accoucheur, while it is of the deepest interest to the patient. It is as follows: In the course of your practice you will occasionally be consulted by pregnant women in consequence of more or less discharge of blood from the vagina; this necessarily will produce much disquietude in the mind of the patient, and the loss of blood may result from the various causes capable of promoting a miscarriage; such, for example, as blows, falls, or fright.

But the cause of the discharge of blood to which I allude, in connexion with the shortening of the cervical portion of the uterus, is of a very different kind, and traceable to a peculiar circumstance. In placenta prævia, the placenta being attached over the mouth of the womb, either centre for centre, or in a portion only of its circumference, one of the most likely things to occur during the seventh, eighth, and ninth months of gestation will be flooding to a greater or less extent—and why? Do you not see the almost necessary connexion between hemorrhage at these terms of pregnancy and placenta prævia? What are the facts? The after-birth is attached, through vascular and other connexions, to the internal surface of the upper or uterine portion of the cervix; you have just seen that, at the end of the sixth month, this portion of the cervix begins to widen, for the purpose of giving increased size to the uterine cavity; now this very expansion will be at the expense of some of the vascular connexions, to which we have just alluded, and hence the flooding. If, therefore, gentlemen, a patient without any assign-

* *Traité Théorique et Pratique de l'Art des Accouchemens.* Par P. CAZEUX. Cinquième Edition, p. 97.

able cause on her part, should, in the latter months of pregnancy, be attacked with a discharge of blood from the vagina, you may legitimately infer that it is because of the implantation of the after-birth over the os uteri. In such an event, the most judicious treatment will be called for; in a future part of the course, when discussing the management of flooding, as connected with placenta prævia, your attention shall be fully directed to the therapeutics of these cases.

The Cervix in the Primipara and Multipara.—We have spoken of the two extremities of the cervix uteri, and you have noted the successive changes which occur in them; you have also seen in what way the cervical canal commences and continues to shorten, until at the completion of utero-gestation it is reduced to a simple circle or ring. It now remains for me to point out certain differences in these modifications depending upon whether they occur in a primipara or multipara, and it is important that you should understand the nature of these variations. In a primipara, all the changes to which we have alluded progress much more tardily than in the female who has borne one or more children. The softening of the uterine tissues is slower, so is the tumefaction of the anterior and posterior lips of the os tinæ; and another essential characteristic of the os tinæ in the primipara is, that it maintains more or less a conoidal form, and is not dilated so as to permit the introduction of the finger. Again: the internal surface of the two lips is uniform, uninterrupted by elevations; and also in the primipara, the shape of the cervical canal is fusiform. In the multipara, there is a more rapid development in the modifications of the gravid organ. The lips of the os tinæ are more protuberant, and the finger can be readily introduced, for the reason that they never assume their original shape after childbirth; so true is this, that you will perceive a very striking contrast in the form of the vaginal extremity of the cervix when compared with that in the primipara; in the latter, it is more or less conoidal, while in the multipara it has been very properly compared to an inverted funnel. In the multipara, also, the internal surface of the lips is irregular; and this irregularity is owing to the circumstance that, during the passage of the child through the os uteri, there have been slight lacerations of the mucous membrane; these lacerations heal, and form afterwards so many cicatrices, which are easily recognised by the touch. ♀

Development of the Uterine Annexæ and External Genitalia.—The general growth of the tissues, consequent upon fecundation, is not limited to the uterus; the appendages of the organ participate more or less in the effect of this increased nutrition; the ovaries nearly double in size, with an augmented volume of their blood-vessels; the same fact is observed with regard to the fallopian tubes; and there is also a marked development in the muscular

fibres of the broad and round ligaments; the vagina and external organs likewise undergo important changes; the former, as pregnancy advances, becomes wider and shorter, and there is a very evident increase in its spongy tissue. The vagina assumes another modification in the latter period of gestation, as has recently been pointed out by Rouget. He has shown that distinct muscular planes can be detected with the naked eye; and this will at once explain the contractile power displayed by this canal during the passage of the fœtus through it. The mucous follicles become larger, and pour out more or less mucus. There is an interesting circumstance connected with this development of the mucous follicles, and it is this—in carrying your finger along the walls of the vagina, you will occasionally have imparted to it a sensation, as if you are touching numerous granulations; and if you do not recollect the reason of this temporary change in structure, you might possibly confound it with a very important affection of the vagina—granular vaginitis, first described by Deville.

The external organs, especially as the final term of gestation approaches, are more or less engorged, and there is an evident relaxation of their tissues. In a word, gentlemen, you cannot but appreciate, as you contemplate these different modifications in the reproductive apparatus, the simple motive, which has so obviously influenced nature—every change, you perceive, has been made tributary to the successful accomplishment of the great act in the reproductive scheme—the birth of the child.

How does the Gravid Uterus Enlarge?—Thickness of its Walls. You have seen that, as the necessary consequence of gestation, the cavity of the uterus enlarges in order to afford accommodation to the germ; and the question arises, how is this enlargement of the uterine cavity effected? The opinion entertained by the old schoolmen upon this subject was a singular one—they taught that the cause of the increase in the size of the organ was altogether mechanical; that, as the embryo gained in development and size, its pressure against the walls of the uterus occasioned a distension equal to its requirements. They, in fact, compared the gradual enlargement of the organ, and supposed it to be accomplished upon the same principle, to the distension of a bladder when filled by air or water.* But the fallacy of this and kindred hypotheses must be apparent to all of you. The uterus grows and becomes developed through the same influence precisely that imparts to the fœtus its growth and development—increased nutrition. Prior to the second

* It is well to remember that this question of the manner in which the gravid uterus becomes enlarged was determined, not by human dissection, for this was one of the precious elements of truthful inquiry from which the ancients were debarred; but from the inspection of the impregnated organ in animals, in some of which, it is conceded, the uterus does enlarge through mechanical distension.

month, the embryo is dependent for its nourishment on other sources, as we shall in the proper place indicate; but after this period it derives its elements of growth from the placenta. The uterus, on the contrary, becomes developed, because of the afflux of fluids and increased circulation setting toward it from the first moment of fecundation until the completion of gestation. So you perceive, gentlemen, that both the uterus and the embryo it contains pass respectively through their phases of increase, by the simple agency of a more active nutrition. If any argument be required to demonstrate the utter absurdity of the ancient theory of mechanical distension, you need only recollect the interesting circumstance that, in extra-uterine pregnancies, the cavity of the uterus undergoes more or less dilatation.*

Thickness of the Walls of the Gravid Uterus.—There has also been much difference of opinion as to the absolute thickness of the walls of the organ during gestation; some contending that they become extremely attenuated, while others maintain that they increase in bulk only at the disc on which the placenta is inserted; and again it is affirmed that the entire increase in the thickness of the parietes is due exclusively to the engorged state of the blood-vessels; this latter fact being attempted to be demonstrated by the circumstance that, in women who have died of uterine hemorrhage, the walls are always less in volume. Now, there is no doubt that the latter statement is true; but admitting its truth, what does it prove? Absolutely nothing, so far as the solution of the point in controversy is concerned; for, while it cannot be denied that there is a relative increase in the thickness of the uterine walls, in consequence of the more active circulation, yet the cardinal fact for you to remember is, that the principal cause of the increased bulk of the gravid uterus is found in the changes of the muscular tissue of the organ; and, as I have already remarked to you, in a previous lecture, these changes are brought about in two ways: 1. By an enlargement of the pre-existing muscular elements; 2. By a new formation of them. So that, while it may be conceded that, after fatal hemorrhage, there is a diminished thickness in the uterine parietes, it must also be recollected that this loss is relative and not absolute, being proportionate only to the amount of disgorgement which the blood-vessels have undergone.

As a general principle—although there will be more or less marked variations in different women—it may be affirmed that, during the period of pregnancy, the thickness of the walls of the uterus is about the same as in the unimpregnated organ. It is greatest at the fundus, especially where the placenta is attached,

* For further details on this subject, the reader may consult with profit an elaborate paper on "The Uterus and its Appendages," by Dr. Arthur Farre (*Cyclopædia of Anatomy and Physiology*, p. 645. London, 1858).

and gradually diminishes towards the cervical portion. Taking twelve lines to the inch, it may be said that, at the fundus, the thickness is from four to five lines, slightly less in the body, and from two to three lines in the cervix; another interesting fact is, that, for the first five or six months of gestation, the thickness rather increases, and after this period its tendency is gradually to diminish.

Let me here direct your attention to an important circumstance with regard to the os uteri at the time of labor. In making a vaginal examination, when labor has fairly commenced, it will be ascertained that the os is oftentimes characterized by extraordinary thinness; and it is this fact which, no doubt, has originated in the minds of some writers the idea that the entire surface of the uterine walls participates in this attenuated condition. So much, you see, for determining a principle by a single circumstance. It is bad logic, and has been fruitful in the spread of unsound lessons. The whole of the testimony or none, is a fundamental maxim in law, and it is not without its application in our profession.

Discoloration of the Vaginal Walls.—Among the changes occurring in the sexual organs consequent upon pregnancy, much importance has recently been attached by certain observers to a discoloration of the internal surface of the vagina; and men of high eminence are disposed to regard it as an evidence of very great value that gestation actually exists. There has been some difference of opinion as to whom belongs the merit of having first called attention to this peculiarity in the color of the vaginal walls, but I think the credit is due to Jacquemin, of Paris, whose opportunities for investigating this subject were of no ordinary limits, having been appointed by the police to examine the generative organs of the prostitutes of the French metropolis—certainly a wise regulation; for if it be an admitted principle that, for the protection of the community, prostitution must be countenanced, then, I say, let it be freed, as far as may be, from the dreadful scourge entailed upon those who indulge in it—I mean the syphilitic taint; and how can this be so effectually accomplished as through the vigilant examinations, made under the police regulations, of the genitals of the prostitutes, who are to be found in such fearful numbers in the great city of Paris. It would be well, indeed, if some such municipal law obtained in New York, which is but the younger twin sister of Paris in all that contributes to the formation of the true greatness of a people, and at the same time panders to the lowest and most degrading vices.

Jacquemin, in describing the discoloration of the vagina, calls it a violet hue, not unlike the lees of wine; and he broadly affirms that, irrespective of any of the other evidences of gestation, this sign alone would be sufficient for him to pronounce upon the

existence of pregnancy. Kilian, of the University of Bonn, a good observer, and a man of much experience, regards the discoloration as one of the "most constant signs of gestation." This opinion is also sustained by Kluge of Berlin, Ricord, Parent-Duchatelet, and others. There can be no doubt that the color of the vagina, in the great majority of cases, does undergo a remarkable change during pregnancy, presenting a sort of bluish tint, and this is altogether the effect of the vascular congestion of the parts.

Many of you, who reside in the rural districts, and who, perhaps, are more or less familiar with that primitive but honorable occupation of man, agriculture, and its kindred pursuits, must recollect the practice usually resorted to by breeders with a view of ascertaining whether the female of many of the lower animals be in a state to receive the male—or, in other words, whether she be in heat. The practice to which I allude is to inspect the outer opening and internal surface of the vagina, which, in season of heat, will be found to exhibit a very dark color—and I am quite satisfied that this same character of discoloration takes place at the advent of the catamenia in woman.*

I have closely watched this latter circumstance, and in the many vaginal examinations which I have made just before the menstrual eruption, I do not know that I have failed in a single instance, in a normal menstruation, to detect this discoloration of the vagina. It seems to me that the true way to arrive at the real value of this sign, as a diagnostic evidence of pregnancy, is to determine, in the first place, the two following inquiries: 1. Is the discoloration of the vagina a universal accompaniment of gestation; 2. Is it ever present, when pregnancy does not exist? I have no hesitation in stating, from my own personal observation, that pregnancy will occasionally pass through its various stages without the slightest cognizable change in the ordinary color of the vagina, and this is more likely to occur in women remarkable for pallor of skin, and especially in those whose pallor is traceable solely to an anæmic condition—whether the anæmia be dependent upon an original deficiency of the red corpuscles, or upon a sudden or long-continued drain upon the system.

In reply to the second point, whether the discoloration is ever present without pregnancy; or, in other words, whether any other cause can produce it, I am quite confident that there are numerous instances, which will amply support the affirmative of this question; and it is with no little surprise that I find so valued an authority as Huguier positively affirming that "this change of color in the vaginal walls is not found in any other condition of the uterus than

* Some interesting facts as to the color of the vagina in domestic animals at the time of *heat* and during gestation, have been recorded by M. Rainard [*Traité complet de la parturition des principales femelles domestiques.*]

that of pregnancy." Now, gentlemen, what are the facts? In the first place, I have told you that the real cause of this bluish aspect of the vagina is vascular congestion, and consequent partial interruption in the ordinary current of the blood. If this be true—and the fact is very generally conceded—it should follow that whenever this vascular congestion is present, no matter from what cause, you may very naturally look for the effect—discoloration of the vagina. You will, therefore, notice the change of color in the case of intra-uterine tumors, in chronic sanguineous engorgement of the uterus, etc. In a word, it is one of the not unusual accompaniments of congestion of the uterus, whether from gestation, or from some morbid influence, with which pregnancy has no possible connexion.

From what has just been said, it is very evident that the value of this sign as a proof of pregnancy, is subject to more or less qualification; and it is also well to mention that delicacy on the part of the female will oftentimes prevent the accoucheur from availing himself of the means of ascertaining whether or not it be present.

LECTURE XII.

Evidences of Pregnancy continued—Quickening—Ancient Theory—Law of England in regard to Quickening—What is Quickening?—Opinions of Authors—Nervous and Muscular Development—Muscular Contractions of the Fœtus—Sensible and Insensible Muscular Contractions—Quickening not a Psychical Act, but the result of Excito-motory Influence—Spinal System—Its Physiological Importance—When does Quickening take Place?—Does not always Occur—Delusive Quickening—Illustration—Contraction of Abdominal Walls mistaken for—Final Cessation of Menses and Supposed Quickening—Attempted Imposition—Queen Mary of England—Manipulations to Detect Quickening—Influence of Cold on Movements of Fœtus—Illustration—Ballottement or Passive Movement of Fœtus—Rules for Detecting—Positions of Fœtus and Ballottement—Pulsations of Fœtal Heart—Auscultation—Mayor of Geneva—Average Beats of Fœtal Heart—Not Synchronous with Maternal Pulse—Auscultation, how Applied—Auscultation and Position of Fœtus—Twin and Extra-uterine Pregnancies—How ascertained—Placental Souffle—Uterine Murmur—Kergaradec—Conflict of Opinions—Souffle not always Dependent upon Pregnancy—Uterine and Abdominal Tumors; Cause of—Souffle no Evidence of Life of Fœtus—Pulsations of Umbilical Cord—Dr. Evory Kennedy.

GENTLEMEN—We shall now proceed to an examination of the evidences of gestation derived from other sources. Thus far we have considered those signs only, which are either so many sympathetic phenomena, or the direct result of increased vital action. The order of signs, to which your attention will now be directed, is not only of special interest, but some of them, when recognised, are conclusive as to the existence of pregnancy. They may be enumerated as follows: 1st, Quickening; 2d, The passive movement of the fœtus, termed by the French, *Ballottement*, by the English, *Repercussion*; 3d, Pulsations of the fœtal heart; 4th, The *Bruit placentaire*, placental souffle, or uterine murmur; 5th, Pulsations of the umbilical cord.

1st. *Quickening*.—This term is employed to designate the particular period of gestation at which, through the movements of the fœtus, the mother becomes for the first time aware that she carries within her a living being. The ancient theory upon this subject was not only singular, but the very essence of absurdity; it inculcated the principle that *quickening* was the simple evidence that, at that very moment, vitality was imparted to the fœtus; and that, therefore, prior to this event, the fœtus was an inanimate mass, without individuality. In those days, when physiology was not a science, and when crude hypothesis oftentimes was substituted for

paniment of pregnancy. The moisture is occasioned by the pouring out of mucus, which is nothing more than the necessary result of an increase in the size of the mucous follicles, which you are aware are found, in more or less abundance, on the internal surface of the cervix. You are not to mistake this secretion of mucus for a morbid or pathological state of the parts—it is in every way a natural and healthy function, and, during the entire progress of gestation, is intended to subserve a most important purpose. Let us examine this point for a moment. After the full development of the fœtus has been accomplished, and it is sufficiently matured in its physical organization to enable it to live independently of its parent, a new train of phenomena is instituted, the object of which is to secure its safe expulsion from the maternal system. Now, in this expulsion, the sexual organs must of necessity be subjected to extraordinary distension, and the os uteri become amply dilated; the walls of the vagina are called upon to contribute largely, and so are the labia. Nature, with consummate forethought, and a provident arrangement worthy of our profound admiration, has taken good care to prepare these organs for the great work of distension.

The mucous follicles, so abundant in the cervix uteri and vagina, are the instruments which she brings to her aid. As pregnancy advances, these follicles become more and more developed, and in proportion to their development will be the secretion of mucus. This very mucus serves to moisten and relax the parts, and thus prepares them for the excessive distension to which they are soon to be subjected. In the latter months of gestation, the mucus is apt to become so abundant as to cause the female to imagine that she has that vague and unmeaning disease the “whites.”* She sends for her medical man, and begs him to give her something to arrest this discharge. If the practitioner be guided by the declarations of his patient—if he should have no mind of his own—or if, in a word, he should not at once perceive that this mucous secretion, in lieu of constituting a pathological condition, is simply one of the wise provisions intended for the successful accomplishment of certain ends, he would most likely prescribe some astringent injection, the tendency of which would be to arrest the discharge, and thus come in direct conflict with the purposes of nature. So you see, gentlemen, how essential it is to distinguish between healthy and morbid phenomena.†

Shortening of the Cervix.—At the same time that these changes are going on in the two lips, there is a progressive increase in the

* See Diseases of Women and Children, “Leucorrhœa,” p. 408.

† While observing the caution suggested, yet it is proper also to recollect that the pregnant woman may, under certain circumstances, be affected with a morbid discharge from the vagina, which will need attention.

volume of the cervical canal, the tissues of which not only become softer, but there is also an augmented capacity in the canal itself. I cannot but think that authors have labored under a remarkable error in stating the mode and degrees of shortening, which the neck of the uterus undergoes during the various periods of pregnancy. It is maintained by many that, at the fifth month, it loses one-third of its length, at the sixth, one-half, two-thirds at the seventh, three-fourths at the eighth, with an entire obliteration at the end of the ninth month. I believe this error is partly traceable to the circumstance that sufficient importance has not been attached to the fact that the cervix, as one of the immediate results of gestation, becomes increased in volume, and this increase of volume is mistaken oftentimes for a diminution of its length.

As far as I have been enabled to arrive at a just conclusion upon the subject—and no little attention has been given to the investigation—I do not think there is any actual loss in the length of the cervix until near the end of the sixth month, and this brings us to the consideration of the manner in which the shortening is accomplished. You have already been informed that the order of development of the gravid uterus is first an enlargement of the fundus, then of the body, and lastly of the cervix; and it is not until toward the termination of the sixth month that the cervix begins to contribute its share to the general capacity of the uterus. At this time, the uterine portion of the neck commences to widen, from which there are two direct results: 1. A shortening of its long axis; 2. An increase in the uterine cavity.

This expansion of the uterine extremity of the cervix now proceeds with more or less uniformity, producing consequently a gradual shortening of the cervix, and at the same time a gradual increase in the capacity of the uterus, so that, at the end of the ninth month, the cervix has so completely surrendered its length, that it presents simply a ring, which is known in obstetric language as its obliteration. If you examine a female in the fifth month of her gestation, on introducing your index finger into the vagina—in the manner we shall hereafter point out—and passing it along the outer surface of the cervix uteri, you will very readily ascertain that its length is unchanged; make this same examination at the seventh month, and, when your finger reaches the uterine portion of the neck, you will at once recognise a remarkable alteration in the condition of things, viz. that this portion of the organ is more expanded, giving an increase to its various diameters, and then it is that you will also appreciate the important circumstance that the cervix commences to diminish in length, this diminution, remember, beginning *above*, and not *below*—or, to be more explicit at the *uterine*, and not at the *vaginal* extremity of the part.

I am thus emphatic upon this point for the reason that a high authority in midwifery, the learned Stoltz, of Strasburg, maintains that the cervical portion of the uterus begins to lose its length from below upward, and positively asserts that the uterine extremity undergoes no change until the latter part of the ninth month. This opinion of the distinguished professor is also participated in by Cazeaux, who, as a writer and observer, occupies deservedly a high position.* I cannot account for the opinion of these distinguished writers. I am confident it is founded in error, and is altogether adverse to bedside experience. If I did not feel the strongest conviction—a conviction amply confirmed by repeated investigation—that I am right in regard to this question, it would be with no little hesitation that I should thus unequivocally, but yet most respectfully, doubt an opinion emanating from such valued authority.

There is, in my judgment, a very essential practical fact connected with the manner of the shortening of the cervix; and it is strange that attention has not been more specially called to it, for it embodies a lesson of great value to the accoucheur, while it is of the deepest interest to the patient. It is as follows: In the course of your practice you will occasionally be consulted by pregnant women in consequence of more or less discharge of blood from the vagina; this necessarily will produce much disquietude in the mind of the patient, and the loss of blood may result from the various causes capable of promoting a miscarriage; such, for example, as blows, falls, or fright.

But the cause of the discharge of blood to which I allude, in connexion with the shortening of the cervical portion of the uterus, is of a very different kind, and traceable to a peculiar circumstance. In placenta prævia, the placenta being attached over the mouth of the womb, either centre for centre, or in a portion only of its circumference, one of the most likely things to occur during the seventh, eighth, and ninth months of gestation will be flooding to a greater or less extent—and why? Do you not see the almost necessary connexion between hemorrhage at these terms of pregnancy and placenta prævia? What are the facts? The after-birth is attached, through vascular and other connexions, to the internal surface of the upper or uterine portion of the cervix; you have just seen that, at the end of the sixth month, this portion of the cervix begins to widen, for the purpose of giving increased size to the uterine cavity; now this very expansion will be at the expense of some of the vascular connexions, to which we have just alluded, and hence the flooding. If, therefore, gentlemen, a patient without any assign-

* *Traité Théorique et Pratique de l'Art des Accouchemens.* Par P. CAZEAUX. Cinquième Edition, p. 97.

able cause on her part, should, in the latter months of pregnancy, be attacked with a discharge of blood from the vagina, you may legitimately infer that it is because of the implantation of the after-birth over the os uteri. In such an event, the most judicious treatment will be called for; in a future part of the course, when discussing the management of flooding, as connected with placenta prævia, your attention shall be fully directed to the therapeutics of these cases.

The Cervix in the Primipara and Multipara.—We have spoken of the two extremities of the cervix uteri, and you have noted the successive changes which occur in them; you have also seen in what way the cervical canal commences and continues to shorten, until at the completion of utero-gestation it is reduced to a simple circle or ring. It now remains for me to point out certain differences in these modifications depending upon whether they occur in a primipara or multipara, and it is important that you should understand the nature of these variations. In a primipara, all the changes to which we have alluded progress much more tardily than in the female who has borne one or more children. The softening of the uterine tissues is slower, so is the tumefaction of the anterior and posterior lips of the os tinæ; and another essential characteristic of the os tinæ in the primipara is, that it maintains more or less a conoidal form, and is not dilated so as to permit the introduction of the finger. Again: the internal surface of the two lips is uniform, uninterrupted by elevations; and also in the primipara, the shape of the cervical canal is fusiform. In the multipara, there is a more rapid development in the modifications of the gravid organ. The lips of the os tinæ are more protuberant, and the finger can be readily introduced, for the reason that they never assume their original shape after childbirth; so true is this, that you will perceive a very striking contrast in the form of the vaginal extremity of the cervix when compared with that in the primipara; in the latter, it is more or less conoidal, while in the multipara it has been very properly compared to an inverted funnel. In the multipara, also, the internal surface of the lips is irregular; and this irregularity is owing to the circumstance that, during the passage of the child through the os uteri, there have been slight lacerations of the mucous membrane; these lacerations heal, and form afterwards so many cicatrices, which are easily recognised by the touch. •

Development of the Uterine Annexæ and External Genitalia.—The general growth of the tissues, consequent upon fecundation, is not limited to the uterus; the appendages of the organ participate more or less in the effect of this increased nutrition; the ovaries nearly double in size, with an augmented volume of their blood-vessels; the same fact is observed with regard to the fallopian tubes; and there is also a marked development in the muscular

fibres of the broad and round ligaments; the vagina and external organs likewise undergo important changes; the former, as pregnancy advances, becomes wider and shorter, and there is a very evident increase in its spongy tissue. The vagina assumes another modification in the latter period of gestation, as has recently been pointed out by Rouget. He has shown that distinct muscular planes can be detected with the naked eye; and this will at once explain the contractile power displayed by this canal during the passage of the fetus through it. The mucous follicles become larger, and pour out more or less mucus. There is an interesting circumstance connected with this development of the mucous follicles, and it is this—in carrying your finger along the walls of the vagina, you will occasionally have imparted to it a sensation, as if you are touching numerous granulations; and if you do not recollect the reason of this temporary change in structure, you might possibly confound it with a very important affection of the vagina—granular vaginitis, first described by Deville.

The external organs, especially as the final term of gestation approaches, are more or less engorged, and there is an evident relaxation of their tissues. In a word, gentlemen, you cannot but appreciate, as you contemplate these different modifications in the reproductive apparatus, the simple motive, which has so obviously influenced nature—every change, you perceive, has been made tributary to the successful accomplishment of the great act in the reproductive scheme—the birth of the child.

How does the Gravid Uterus Enlarge?—Thickness of its Walls. You have seen that, as the necessary consequence of gestation, the cavity of the uterus enlarges in order to afford accommodation to the germ; and the question arises, how is this enlargement of the uterine cavity effected? The opinion entertained by the old schoolmen upon this subject was a singular one—they taught that the cause of the increase in the size of the organ was altogether mechanical; that, as the embryo gained in development and size, its pressure against the walls of the uterus occasioned a distension equal to its requirements. They, in fact, compared the gradual enlargement of the organ, and supposed it to be accomplished upon the same principle, to the distension of a bladder when filled by air or water.* But the fallacy of this and kindred hypotheses must be apparent to all of you. The uterus grows and becomes developed through the same influence precisely that imparts to the fetus its growth and development—increased nutrition. Prior to the second

* It is well to remember that this question of the manner in which the gravid uterus becomes enlarged was determined, not by human dissection, for this was one of the precious elements of truthful inquiry from which the ancients were debarred; but from the inspection of the impregnated organ in animals, in some of which, it proceeded, the uterus does enlarge through mechanical distension.

month, the embryo is dependent for its nourishment on other sources, as we shall in the proper place indicate; but after this period it derives its elements of growth from the placenta. The uterus, on the contrary, becomes developed, because of the afflux of fluids and increased circulation setting toward it from the first moment of fecundation until the completion of gestation. So you perceive, gentlemen, that both the uterus and the embryo it contains pass respectively through their phases of increase, by the simple agency of a more active nutrition. If any argument be required to demonstrate the utter absurdity of the ancient theory of mechanical distension, you need only recollect the interesting circumstance that, in extra-uterine pregnancies, the cavity of the uterus undergoes more or less dilatation.*

Thickness of the Walls of the Gravid Uterus.—There has also been much difference of opinion as to the absolute thickness of the walls of the organ during gestation; some contending that they become extremely attenuated, while others maintain that they increase in bulk only at the disc on which the placenta is inserted; and again it is affirmed that the entire increase in the thickness of the parietes is due exclusively to the engorged state of the blood-vessels; this latter fact being attempted to be demonstrated by the circumstance that, in women who have died of uterine hemorrhage, the walls are always less in volume. Now, there is no doubt that the latter statement is true; but admitting its truth, what does it prove? Absolutely nothing, so far as the solution of the point in controversy is concerned; for, while it cannot be denied that there is a relative increase in the thickness of the uterine walls, in consequence of the more active circulation, yet the cardinal fact for you to remember is, that the principal cause of the increased bulk of the gravid uterus is found in the changes of the muscular tissue of the organ; and, as I have already remarked to you, in a previous lecture, these changes are brought about in two ways: 1. By an enlargement of the pre-existing muscular elements; 2. By a new formation of them. So that, while it may be conceded that, after fatal hemorrhage, there is a diminished thickness in the uterine parietes, it must also be recollected that this loss is relative and not absolute, being proportionate only to the amount of disgorgement which the blood-vessels have undergone.

As a general principle—although there will be more or less marked variations in different women—it may be affirmed that, during the period of pregnancy, the thickness of the walls of the uterus is about the same as in the unimpregnated organ. It is greatest at the fundus, especially where the placenta is attached,

* For further details on this subject, the reader may consult with profit an elaborate paper on "The Uterus and its Appendages," by Dr. Arthur Farre (*Cyclopædia of Anatomy and Physiology*, p. 645. London, 1858).

and gradually diminishes towards the cervical portion. Taking twelve lines to the inch, it may be said that, at the fundus, the thickness is from four to five lines, slightly less in the body, and from two to three lines in the cervix; another interesting fact is, that, for the first five or six months of gestation, the thickness rather increases, and after this period its tendency is gradually to diminish.

Let me here direct your attention to an important circumstance with regard to the os uteri at the time of labor. In making a vaginal examination, when labor has fairly commenced, it will be ascertained that the os is oftentimes characterized by extraordinary thinness; and it is this fact which, no doubt, has originated in the minds of some writers the idea that the entire surface of the uterine walls participates in this attenuated condition. So much, you see, for determining a principle by a single circumstance. It is bad logic, and has been fruitful in the spread of unsound lessons. The whole of the testimony or none, is a fundamental maxim in law, and it is not without its application in our profession.

Discoloration of the Vaginal Walls.—Among the changes occurring in the sexual organs consequent upon pregnancy, much importance has recently been attached by certain observers to a discoloration of the internal surface of the vagina; and men of high eminence are disposed to regard it as an evidence of very great value that gestation actually exists. There has been some difference of opinion as to whom belongs the merit of having first called attention to this peculiarity in the color of the vaginal walls, but I think the credit is due to Jacquemin, of Paris, whose opportunities for investigating this subject were of no ordinary limits, having been appointed by the police to examine the generative organs of the prostitutes of the French metropolis—certainly a wise regulation; for if it be an admitted principle that, for the protection of the community, prostitution must be countenanced, then, I say, let it be freed, as far as may be, from the dreadful scourge entailed upon those who indulge in it—I mean the syphilitic taint; and how can this be so effectually accomplished as through the vigilant examinations, made under the police regulations, of the genitals of the prostitutes, who are to be found in such fearful numbers in the great city of Paris. It would be well, indeed, if some such municipal law obtained in New York, which is but the younger twin sister of Paris in all that contributes to the formation of the true greatness of a people, and at the same time panders to the lowest and most degrading vices.

Jacquemin, in describing the discoloration of the vagina, calls it a violet hue, not unlike the lees of wine; and he broadly affirms that, irrespective of any of the other evidences of gestation, this sign alone would be sufficient for him to pronounce upon the

existence of pregnancy. Kilian, of the University of Bonn, a good observer, and a man of much experience, regards the discoloration as one of the "most constant signs of gestation." This opinion is also sustained by Kluge of Berlin, Ricord, Parent-Duchatelet, and others. There can be no doubt that the color of the vagina, in the great majority of cases, does undergo a remarkable change during pregnancy, presenting a sort of bluish tint, and this is altogether the effect of the vascular congestion of the parts.

Many of you, who reside in the rural districts, and who, perhaps, are more or less familiar with that primitive but honorable occupation of man, agriculture, and its kindred pursuits, must recollect the practice usually resorted to by breeders with a view of ascertaining whether the female of many of the lower animals be in a state to receive the male—or, in other words, whether she be in heat. The practice to which I allude is to inspect the outer opening and internal surface of the vagina, which, in season of heat, will be found to exhibit a very dark color—and I am quite satisfied that this same character of discoloration takes place at the advent of the catamenia in woman.*

I have closely watched this latter circumstance, and in the many vaginal examinations which I have made just before the menstrual eruption, I do not know that I have failed in a single instance, in a normal menstruation, to detect this discoloration of the vagina. It seems to me that the true way to arrive at the real value of this sign, as a diagnostic evidence of pregnancy, is to determine, in the first place, the two following inquiries: 1. Is the discoloration of the vagina a universal accompaniment of gestation; 2. Is it ever present, when pregnancy does not exist? I have no hesitation in stating, from my own personal observation, that pregnancy will occasionally pass through its various stages without the slightest cognizable change in the ordinary color of the vagina, and this is more likely to occur in women remarkable for pallor of skin, and especially in those whose pallor is traceable solely to an anæmic condition—whether the anæmia be dependent upon an original deficiency of the red corpuscles, or upon a sudden or long-continued drain upon the system.

In reply to the second point, whether the discoloration is ever present without pregnancy; or, in other words, whether any other cause can produce it, I am quite confident that there are numerous instances, which will amply support the affirmative of this question; and it is with no little surprise that I find so valued an authority as Huguier positively affirming that "this change of color in the vaginal walls is not found in any other condition of the uterus than

* Some interesting facts as to the color of the vagina in domestic animals at the time of *heat* and during gestation, have been recorded by M. Rainard [*Traité complet de la parturition des principales femelles domestiques*]

that of pregnancy." Now, gentlemen, what are the facts? In the first place, I have told you that the real cause of this bluish aspect of the vagina is vascular congestion, and consequent partial interruption in the ordinary current of the blood. If this be true—and the fact is very generally conceded—it should follow that whenever this vascular congestion is present, no matter from what cause, you may very naturally look for the effect—discoloration of the vagina. You will, therefore, notice the change of color in the case of intra-uterine tumors, in chronic sanguineous engorgement of the uterus, etc. In a word, it is one of the not unusual accompaniments of congestion of the uterus, whether from gestation, or from some morbid influence, with which pregnancy has no possible connexion.

From what has just been said, it is very evident that the value of this sign as a proof of pregnancy, is subject to more or less qualification; and it is also well to mention that delicacy on the part of the female will oftentimes prevent the accoucheur from availing himself of the means of ascertaining whether or not it be present.

LECTURE XII.

Evidences of Pregnancy continued—Quickening—Ancient Theory—Law of England in regard to Quickening—What is Quickening?—Opinions of Authors—Nervous and Muscular Development—Muscular Contractions of the Fœtus—Sensible and Insensible Muscular Contractions—Quickening not a Psychical Act, but the result of Excito-motory Influence—Spinal System—Its Physiological Importance—When does Quickening take Place?—Does not always Occur—Delusive Quickening—Illustration—Contraction of Abdominal Walls mistaken for—Final Cessation of Menses and Supposed Quickening—Attempted Imposition—Queen Mary of England—Manipulations to Detect Quickening—Influence of Cold on Movements of Fœtus—Illustration—Ballottement or Passive Movement of Fœtus—Rules for Detecting—Positions of Fœtus and Ballottement—Pulsations of Fœtal Heart—Auscultation—Mayor of Geneva—Average Beats of Fœtal Heart—Not Synchronous with Maternal Pulse—Auscultation, how Applied—Auscultation and Position of Fœtus—Twin and Extra-uterine Pregnancies—How ascertained—Placental Souffle—Uterine Murmur—Kergaradec—Conflict of Opinions—Souffle not always Dependent upon Pregnancy—Uterine and Abdominal Tumors; Cause of—Souffle no Evidence of Life of Fœtus—Pulsations of Umbilical Cord—Dr. Evory Kennedy.

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truthful and scientific research, it is not strange that such opinions should have obtained. But that this hypothesis, false, and, in every sense, adverse to facts, should, almost in our own times, have been adopted by one of the most enlightened countries in the world, and made the basis of an important law, is a matter which, were it not for the unerring evidence of the Statute Book, would scarcely fall within the range of credibility. The Ellenborough act, of 1803, holds the following inconsistent and unworthy language: "If an individual shall wilfully or maliciously procure abortion in a woman, *not quick with child*, the crime shall be declared felony, and the offender may be fined, imprisoned, set in the pillory, publicly whipped, or transported for any term not exceeding fourteen years; but if the offence be committed *after quickening*, it shall be punishable with death." Now, gentlemen, allow me to ask—Why this distinction in the award of punishment for a crime which, as physiologists, you know to be nothing short of *murder*, whether committed *before* or *after* the period of *quickening*?*

What is the difference between the ovule secreted by the ovary, which passes from the system with the menstrual blood, and the ovule on which is exercised the specific influence of the spermatic fluid of the male? The broad, unequivocal, true physiological difference is, that the former is dead, deciduous matter, and, like all things dead, has no inherent power of development. The latter, on the contrary, is vitalized; the very act of fecundation infuses life into it, and it proceeds on its mission of development until, prepared by successive increase for independent life, it is expelled from the organs of its parent. You see, therefore, physiologically speaking, the embryo is as much alive in the earliest stages of fecundation as at any future period of its intra-uterine existence. The mould of the future being is there, with all the necessary elements, through progressive development, for perfect physical organization. Like the little acorn, which, falling from the parent tree, if it find shelter beneath congenial soil, and be allowed to pursue uninterrupted its natural phases, will become matured into an oak as majestic and sturdy as the one to which it owes its own existence. Away, then, with the absurdity, and, in the exercise of your prerogative as medical men, whether in the chamber of sickness, or on the witness-stand in courts of justice, remember that he who,

* Within a few years, this law has been modified, and stands as follows: "Who, soever, with the *intent* to procure the miscarriage of any woman, shall unlawfully administer to her, or cause to be taken by her, any poison or other noxious thing, or shall unlawfully use any instrument, or other means whatsoever, with the like *intent*, shall be guilty of felony, and being convicted thereof, shall be liable, at the discretion of the Court, to be transported beyond the seas for the term of his or her natural life, or for any term not less than fifteen years, or be imprisoned for any term not exceeding three years." [1 Victoria, c. lxxxv. s. 6.]

from sordid motives, or with a view to conceal his own crime, shall produce abortion is, in the eye of heaven, equally guilty of murder, whether the act be perpetrated before or after quickening.

The true Import of the Term Quickening.—Let us now inquire what it is that gives rise to the movement, known as *quickening*. Is it really the movement of the fœtus, or is it attributable to movement of some other organ? You will observe, in the course of your reading, various theories upon this subject. Some maintain that the seat of the sensation of quickening is not to be referred to the fœtus, but will be found to be in the abdominal walls of the woman.* Others, with Royston, attribute it to the sudden passage of the uterus from the pelvis into the abdominal cavity; while again, it is said that quickening is nothing more than the “evidence of the contractile tissues of the uterus being so far developed, as to admit of the peristaltic actions of the organ.” It really seems to me that much time has been uselessly wasted in the attempted explanations of a circumstance which, in my judgment, is in no way difficult of comprehension.

The sensation first imparted to the parent, no matter how slight, which makes her conscious that she is pregnant, and that the product of conception is alive, is a sensation traceable to nervous and muscular development. As soon as the nervous and muscular tissues of the fœtus have received sufficient growth to enable them to enter upon their specific and legitimate functions, it is through the agency of one of these functions—muscular contraction—that the mother becomes sensible of her situation. *Quickening*, then, is nothing more than the ordinary result of progressive increase—in other words, the physical organization of the fœtus has reached a state of development, which imbues it with the power of movement—a movement dependent upon muscular contraction. This contraction may be divided, for practical purposes, into two kinds—sensible and insensible. In the former instance, it is sufficiently strong to impart the sensation to the mother; in the latter, so feeble that she does not become cognizant of it. So you perceive, gentlemen, that while the sensible muscular contractions of the fœtus may be said to constitute quickening, yet the insensible muscular contractions may take place some time previously to the period at which quickening usually occurs. Again, the accoucheur, with skilful manipulation, will occasionally be enabled to recognise the active movements of the fœtus before they have become apparent to the mother. I have met with more than one instance of this kind, and it is of importance to remember the circumstance.

* Eggert says, the fœtus has nothing whatever to do with the movements known as quickening—they being exclusively confined to the abdominal and uterine parietes. [Rust's Magazine; vol. xvii., p. 62.]

Dr. Montgomery* states that he has had several similar examples; and the fact is confirmed by other observers.

I have just stated that the quickening of the fœtus in *utero* is the result of muscular contraction of the fœtus itself. This is undoubtedly true, but as intelligent students, who should not be content with the simple affirmation of a fact, but who, in the true spirit of philosophy, have a right to seek its explanation, it is quite reasonable that you should ask what it is that gives rise to this action of the muscular system. Is it the result of volition, or, in other words, is it a *psychical* act; or does it depend upon something beyond the control of the will? The muscular movements of the fœtus in its mother's womb are reflex phenomena, the products of excito-motory influence, an influence not dependent upon the brain, but traceable exclusively to what has been denominated the true spinal system. This system is not only the source of muscular movement, but it is the very fountain of life itself.

Those of you whose attention has not been particularly directed to the subject, might, perhaps, express surprise, if indeed you did not manifest more than ordinary incredulity at the statement that an infant born without cerebrum or cerebellum, or without both, is capable of breathing, crying, taking its parent's breast and performing other acts connected with life. But while the researches of the physiologist have established the fact beyond a peradventure—they have gone further, and demonstrated that, without the spinal cord, no matter how perfect may be the cerebral mass, life cannot be maintained, for the reason that the two essential functions of the economy, respiration—and, consequently, circulation—on which the various organic functions depend, are the results of reflex action of the medulla spinalis. You cannot, therefore, but appreciate the importance of this nervous centre, not only as the source of those forces constituting life, but also as the source from which emanate, either directly or indirectly, many of the disturbing influences, which derange and impair the human mechanism. I shall have occasion to call your attention to the physiology of the spinal system in connexion with the subject of parturition, and you will plainly see that child-birth is but another of those operations of the physiological law, which are constantly presenting themselves to our observation.

Period of Quickening.—A pregnant woman usually quickens about the middle term of pregnancy, say the fourth and a half month. But there is no uniform rule on this subject. I have known quickening to occur as early as the fourth month, sometimes not until the end of the fifth, and you will, in the course of your practice, occasionally meet with cases of gestation in which the

* Signs and Symptoms of Pregnancy, p. 119.

mothers have experienced no sensation of life during the entire term of pregnancy, and yet bring forth healthy and fully developed infants. If you ask me to explain this, I must acknowledge that I cannot. It is no doubt due to some idiosyncrasy, either on the part of the parent or child, which I do not comprehend, and which, therefore, it would be useless to attempt to elucidate. It may, peradventure, be that these fœtuses are a species of "Lazy Lawrence," too indolent even to be made to move. We have many examples of this indomitable love of repose in both boys and men, who have long since left their mothers' womb. They have no object in life—they simply vegetate and die, and history keeps no record of either their advent or departure.

Simulated Quickening.—But, gentlemen, what is especially interesting to you as accoucheurs, and more urgently so in reference to the diagnosis of pregnancy, is, that married women, who are not in gestation, will sometimes imagine they feel life, and this hallucination will occasionally be so marked that it may possibly convert you to their mode of thought, and lead to serious error of judgment.

On the principle that a medical man should be as ready to acknowledge his delinquencies as to proclaim his triumphs, and with the sincere hope that the recollection of it may hereafter admonish you of the necessity of caution, I shall cite the following interesting case, which occurred to me some years since: A married lady, the mother of eight children, came from British Guiana, for the purpose of placing herself under my professional care—her health had been quite infirm for two years previously to my seeing her. On an examination of her case, I discovered that she was laboring under asthenic dropsy, from chronic disease of the liver. In communicating my opinion to her, she very courteously remarked that it was quite possible she was affected with dropsy, but she knew very well that she was also pregnant. I asked her why she thought so, and how far advanced she imagined herself to be in gestation, to which she replied that she had, for six weeks previously, very distinctly felt the movements of her child, and that, according to her calculation, which had never failed her in previous pregnancies, she was in her sixth month. Although I had suspected nothing of this kind previous to the positive declaration of the patient, yet such was her inexorable conviction on the point, that I immediately proposed to institute an examination, for the purpose of satisfying my own mind. This she strenuously refused, saying that "It would be nonsense, as she was as fully convinced of her situation as she was that she was a living woman."

Under these circumstances, I was content to submit the question of pregnancy to the future, and proceeded to do all in my power to relieve the formidable disease with which she was affected. So

dilapidated was her general health, and such the character of her malady, that I found my efforts limited to the mere temporary palliation of symptoms. She continued to increase in size, which circumstance she constantly referred to her pregnancy; and every day that I visited her, she declared she felt more and more distinctly the movements of her child. She would often, as she reposed on her couch, take my hand, place it on her abdomen, and exclaim; "There, Doctor, do you not feel it?" I must confess I never did feel it, but courtesy, contrary to conviction—so positive was this lady of her situation—frequently wrung from me an equivocal, but reluctant assent. There was another conviction which had taken a strong hold of the mind of this estimable woman, and it consisted in the full belief that, as soon as she should give birth to her child, she would regain her health.

Well, gentlemen, things passed on in this way until, according to her own computation, she was, as it were, on the borders of confinement; and, at her urgent request, I engaged for her a monthly nurse, who immediately entered upon duty. A singular feature in the case was, that the very day corresponding with the period when she expected her labor, I was sent for in great haste, and on entering the room, my patient observed: "Doctor, you see I am not mistaken." This lady assured me, and the statement was confirmed by the nurse, that for an hour previous to my arrival, labor pains had commenced. On making a vaginal examination, you may readily imagine my embarrassment on discovering that the uterus was unchanged, and that no pregnancy existed! Still it occurred to me that it might possibly be a case of extra-uterine foetation. I soon, however, after due exploration, decided in my own mind that this was not so. I need scarcely tell you that I stood self-rebuked. I had neglected my duty. I was bound by every principle of self-respect, by the very reasons I have so repeatedly urged upon you, to have insisted—when this lady first placed herself under my care, and disclosed to me her well-settled conviction that she was pregnant—upon an examination, which would have enabled me to decide the question; or, in the event of my failing to obtain her consent, it was an obligation which I owed both her and myself, to withdraw from the responsibility of the case, for I maintain that the medical man, when denied jurisdiction, should not assume responsibility. I must confess, gentlemen, my conduct on this occasion was not at all in keeping with my usual mode of doing things, for I usually insist—and succeed too—as it is termed, "in having my own way" in the sick room. But let us return to the patient. For the instant I was at a loss what to do. Knowing the ardent hope she entertained of her recovery as soon as she should give birth to her child, and well aware, also, of the extreme infirmity of her health, I was apprehensive that a sudden and

positive assurance on my part that she was not pregnant, would result most disastrously to my suffering patient. Accordingly, under the circumstances, I thought it most judicious to invoke counsel, and I requested my distinguished friend, the late Dr. John W. Francis, to visit her with me. He, after an examination, corroborated my opinion, and the lady was then made acquainted with the conclusion at which we had arrived. Such is the operation of mind upon matter, so sovereign the influence of the mind over the body, that, almost from the moment the disclosure was made to her, she began to sink, and in four days her sufferings were at an end.

There are various conditions of system in which women will be apt to imagine they feel the motions of the fœtus, and, therefore, it requires more than ordinary caution on the part of the practitioner, in order that error may be avoided. For example, women of extreme nervous susceptibility, hysterical women, who are usually more or less annoyed by a flatulent state of the intestinal canal, will sometimes mistake a movement in the abdomen, dependent entirely upon a morbid condition, for the active movement of the child. Married ladies who have not borne children, and who, at the approach of the period of the final cessation of the catamenia, usually enlarge in the abdomen from a deposit of adipose matter, will occasionally suppose themselves pregnant, and they will assure you that they have distinctly "felt life."*

Again, women, from avaricious or other motives, will feign pregnancy, and, among their other devices, will attempt to impose upon the judgment of the practitioner, by simulating the movements of the fœtus, through the contraction of their abdominal muscles. When I held the Professorship of Obstetrics in Charleston, South Carolina, Dr. Bennett, of that city, kindly afforded me an opportunity of presenting to my class a very interesting case, in the person of an old colored woman answering to the name of "Aunt Betty." She was well-known in Charleston as "the old

* Some ludicrous blunders have been made in these cases; females who have been married for many years, and who, notwithstanding every legitimate effort on their part—faithfully aided, no doubt, by their devoted consorts—having failed in the consummation of their wishes—the production of offspring—are extremely prone to mistake, as the era of the final cessation advances, the phenomena usually accompanying this important climacteric for so many evidences of gestation. The cessation of the menses, the increased size of the abdomen, together with the numerous nervous perturbations consequent upon this transition state of the economy, are readily treasured up as so many indications that "hope deferred" is at last to be gratified; and what is worth recollecting is, that it is generally extremely difficult to persuade these good ladies that what they have regarded as so many evidences of their pregnancy, are but the emphatic, yet sad declarations of nature that the springtime of life has passed, and they are about to lapse into the cold shades of winter.

woman who had been pregnant for fifteen years," and I was informed that she had accumulated some money by showing the curious how actively her little child "jumped in the womb."

She was in good health, and quite corpulent. As "Aunt Betty" sat before me, there was considerable movement in the abdomen, which I very soon noticed she should cause at pleasure. She was fifty-five years old, and had not menstruated for ten years. After presenting her to my class, and, under the full conviction that she was not pregnant, I succeeded, with much coaxing, in obtaining her consent that I should examine her, which privilege she positively declared she had never previously granted any one. The uterus was not enlarged; she was not pregnant, and the deception, which had been practised on the credulous, was quite evident—she had, from long habit, accustomed herself to cause the abdominal muscles to contract, which so closely simulated the movements of the fœtus that she successfully carried out her scheme. Before I left Charleston, the good old woman died, and I was enabled, by a post-mortem examination, at which Drs. Francis Y. Porcher, J. B. Whitridge, and Dr. Bennett, were present, to confirm the accuracy of the diagnosis. There was nothing remarkable revealed by the autopsy except that the omentum was loaded with fatty matter, which accounted in part for the enlargement of the abdomen.

Sometimes young, unmarried women will apply to you for professional advice, and beg you to give them medicine to make them regular. They will tell you, apparently, a very consistent story. It is not unusual for them to have a protuberant abdomen, and if you inquire about it, they will say, "It is only a swelling they got since they caught cold," or something equally satisfactory. Should you place your hand on the abdomen, and recognise the movements of the fœtus—not unlikely to occur in some of these cases—and ask the woman if she has ever noticed this peculiar motion, you will be surprised, gentlemen, at the ready coolness with which she will oftentimes reply, "Oh! yes, doctor, I am dreadfully troubled with it—it is wind in my stomach!"* You must be on your guard—a woman who has fallen is generally well versed in the wily tricks

* Dr. Keiller reported to the Edinburgh Obstetrical Society, March, 1850, the particulars of a very remarkable case not only of spurious pregnancy but spurious parturition:

"He was sent for to what was regarded a very painful and protracted labor in which, according to the opinion of the attending accoucheur, the *Cesarean section* was imperatively demanded. He was astonished to find that all the symptoms of parturition were spurious, and the uterus was unimpregnated. The friends ridiculed the idea that it was not real labor, as the motions of the child could be not only felt, but seen through the walls of the distended abdomen, and the patient herself insisted that the child's movements were so violent that she feared "it would leap through her side." The symptoms were referable in a great measure to hysteria."

of life—and she will bring every subterfuge to bear in the hope that she may conceal from the public view the evidences of her own shame!

Queen Mary, of England, is a striking example of how far imagination, excited by the earnest desire to have issue, may sometimes impose on good sense and moral worth. She was so confident that she felt the movements of the child *in utero*, that public proclamation was made of the interesting circumstance, and the intelligence sped with the wings of lightning throughout the courts of Europe. Eager, indeed, was expectation, and high the hopes of the Queen—her people rejoiced, and national oblations offered for the coming event, which was to make so many of her subjects happy. But, alas! the future threw a gloom over this cherished anticipation. The supposed quickening was but the result of impaired health and incipient dropsy.*

How can Foetal Movements be Excited?—We now come to a very important question—How can the movements of the fœtus *in utero* be excited? It is quite obvious that, in many cases of supposed or doubtful pregnancy, the accoucheur will be most anxious to decide the question by ascertaining, through certain manipulations, whether or not the child moves in its mother's womb. This fact being positively settled, places the existence of gestation beyond all contingency—it does more, for while it demonstrates that the woman is pregnant, it establishes also that the child is alive. Most authors recommend, in this exploration, that the patient shall be placed in the recumbent posture, with the thighs flexed, and the chest gently elevated for the purpose of relaxing the abdominal walls. In my own judgment, it is much better, for the object will be more readily attained, to allow the abdominal muscles to be on the stretch, rather than in a state of relaxation, and therefore—although it may sometimes be inconvenient to the patient—I would prefer conducting the examination either in the standing or sitting position. If, in the latter, the

* Hume makes the following allusion to the case: "The Queen's extreme desire to have issue had made her family give credit to any appearance of pregnancy; and when the legate was introduced to her, she fancied she felt the embryo stir in her womb. Her flatterers compared this motion of the infant to that of John the Baptist, who leaped in his mother's belly at the salutation of the Virgin. Dispatches were immediately sent to inform foreign courts of this event; orders were issued to give public thanks; great rejoicings were made; the family of the young Prince was already settled, for the Catholics held themselves assured that the child was to be a male; and Bonner, Bishop of London, made public prayers. He said that heaven would pledge to render him beautiful, vigorous, and witty. But the nation still remained somewhat incredulous, and many were persuaded that the Queen labored under infirmities, which rendered her incapable of having children. Her infant proved only the commencement of a dropsy, which the disordered state of her health had brought upon her." [History of England, ch. xxxvi.]

patient should place herself upright in the chair, with her head and shoulders inclined slightly backward. Now, gentlemen, let us understand ourselves—what is it you wish to discover? Simply whether the child moves *in utero*. I have told you that the movement is an *excito-motory* act; it is obvious, therefore, that you will be most likely to succeed in your investigations by having recourse to those means best calculated to promote the physiological or excito-motory influence.

Excito-motory action, in physiological language, consists of two distinct influences—one of these influences commences at the circumference, and travels to the centre, from which emanates, and as a consequence, an action called *reflex*. The phenomena are produced exclusively through nervous agency. You know very well that a capital remedy in severe uterine hæmorrhage is the cold dash applied to the abdomen—it is capital, because it will very generally produce contraction of the womb, and thus arrest the flooding. But, what is the *modus in quo* of this agent thus applied—on what principle does it cause uterine contraction? On the principle clearly of reflex or excito-motory influence. For example, the peripheral extremities of the nerves distributed upon the abdominal walls become primarily stimulated by the cold; this impression is instantly conveyed, through these nerves, to the medulla spinalis, which imparts to the motor nerves passing from it to the uterus a new impulse; and it is to this impulse, transmitted by these nerves to the muscular tissue of the uterus, that the contractions of the organ are to be referred. Upon the same principle precisely, will you sometimes observe the magic effects, in uterine hæmorrhage, of a piece of ice placed in the vagina. I have many times had recourse to this simple remedy, efficient only on the ground of a sound physiological principle, and with the happiest results.

Now, then, for the movements of the fœtus—they may be excited in various ways. Sometimes, the placing of the hand on the abdomen of the mother, and gently pressing it, will answer the purpose. At other times, place one hand flat on one side of the abdomen, and, with the fingers of the other, percuss the opposite side, as you would in attempting to detect fluctuation. Again, thrust the hand into a vase of ice water, and suddenly apply it to the abdomen. It is necessary here to state, as has been pointed out by Prof. Simpson and Bischoff, that the movements, which occur on the application of the cold hand to the abdomen, are movements in the first place of the uterus itself through a reflex action; but this very movement of the womb causes it to press against the fœtus, and thus induces action in the latter.*

* It should be remembered that these movements of the uterus may be observed before the fœtus can move, or even after its death; and also in cases of uterine enlargement from the presence of some morbid growth.

Some women will tell you that, on experiencing pain in one point of the abdomen, they will make pressure on the affected part, and immediately feel the movement of the fœtus. This pain is oftentimes produced by the pressure of some portion of the fœtus against the abdominal walls, usually one of the extremities, and as the mother, to relieve herself, pushes the extremity from the painful part of the abdomen, she excites the movement of the child. If any of you have ever witnessed an arm presentation when the arm has passed from the uterus into the vagina, you, perhaps, have noticed that on touching the protruding hand the child will move. This is an interesting example of reflex or excito-motory action. An old author, whose name I do not now recollect, recommended as a sovereign remedy in arm presentations, to prick the palm of the hand with a needle, which, as he alleges, will cause the child to withdraw its arm into the uterus. No doubt, the recommendation was based upon the circumstance I have just stated; but it will prove utterly nugatory so far as the effect mentioned is concerned; and I may also remark that the author who suggested the remedy was entirely ignorant—for the physiology of reflex action was then unknown—of the true explanation of the movement following the pricking the palm of the hand.

2d. *Ballottement or Passive Motion of the Fœtus*.—Ballottement or repercussion means nothing more than the passive movement of the child *in utero*—and differs, therefore, from *quickening* in the essential fact that the latter is the result of muscular contraction, while the ballottement is purely *passive*, a movement in no way connected with any inherent action of the fœtus itself. For example, when a pregnant woman suddenly turns from one side to the other in the recumbent posture, she may tell you she distinctly feels something fall, as it were, to the side on which she reclines. This is the fœtus which, obedient to the laws of gravity, and floating in a quantity of amniotic fluid, follows the impulse given to it by the change of position assumed by the mother. The ballottement, when recognised, possesses great value as a sign of pregnancy. As a general rule, it does not occur earlier than the fourth month, and, according to my experience, it is most readily detected between the sixth and seventh months. Later than this, owing to the increased growth of the fœtus restricting its playground, it is more or less difficult of recognition. It is worthy of recollection that sometimes it evades the most skilful manipulation, during the whole course of pregnancy; and I am inclined to the opinion that, in such cases, one or two circumstances will exist to account for the failure—either an unusually small quantity of liquor amnii, or a cross presentation of the fœtus. This is not a mere speculation of mine—it is substantiated by accurate and well attested data. I have on several occasions failed in detecting the passive movement

of the fœtus; and, in acquainting myself with the actual history of the cases at the time of parturition, I have found one or other of the above circumstances to be present. The following case, I think, is in point:

A lady from North Carolina, consulted me in December, 1858, for what she supposed to be a morbid growth in her womb. She had been married eleven years, was 39 years of age, and had never become pregnant. Her menses had always been regular as to time, but not free in quantity, until July previous to seeing her. With a very thorough examination of her case, although I failed completely to detect the ballottement, after repeated and careful trials, I pronounced her pregnant. My opinion was based upon unexceptionable testimony. 1st. The active movements of the child. 2d. The presence of the true areola. The lady would not believe that I was right in my opinion—but being an intelligent woman, she accepted the compromise which I proposed to her—if, at the end of a few months, she did not prove a mother, that I would consent to be denounced, not only as a false prophet, but as unworthy of all confidence. The emphatic and positive manner in which I spoke tended to remove her doubts, and she soon surrendered her previous conviction. She returned to Carolina, and, on the 15th of the following April, was delivered of a healthy living son, for the safety of which she was indebted to the skill of her physician, Dr. Shepperd, who was compelled to perform version in consequence of a shoulder presentation. It was this form of presentation, no doubt, which prevented my recognising the ballottement.

Mode of Detecting Ballottement.—The rules for detecting this movement are simple. In the first place, the examination may be made either in the erect or recumbent position. The index finger of one hand is to be introduced into the vagina, and carried upward and backward to the portion of the uterus at which the neck and body of the organ unite—the other hand is to be applied expanded over the abdomen, for the purpose of grasping the fundus of the womb. You are then gently and suddenly to press with the index finger from *below upward*, and from *behind forward*, against the body of the uterus; this pressure will usually cause a momentary ascent of the fœtus, which immediately again descends, and rebounds, as it were, against the finger. This sensation, once experienced, is quite confirmatory of the condition of the female;* for you must remember

* I was requested by a medical gentleman of this city to visit his wife, in consultation with his friend and family physician, Dr. Freeman. The lady had suffered, Dr. Freeman informed me, for more than a year from ovarian disease; for two months previous to my seeing her, she had been voiding quantities of pus per rectum. The patient was much emaciated from this circumstance. On an examination, I found the right ovary much enlarged, and it was evident that it had taken

that the relation of the embryo to the uterus is peculiar; though lodged within the womb, yet it enjoys great capacity for motion, either active or passive, for the reason that it is surrounded by more or less amniotic fluid, which enables it to rebound to any impulse which it may receive. I know of no other condition of the uterus, either healthy or morbid, other than pregnancy, capable of producing this sensation of rebound, and therefore, when the latter is really recognised, it is an indication of pregnancy of very great import.

3d. *Pulsations of Fœtal Heart.*—One of the striking evidences of the progress of science, developing, as it proceeds, new facts, calculated, by their proper application, for the benefit of the human family, is exhibited in the discovery published in 1818, by M. Mayor, of Geneva, that, by the aid of auscultation, the heart of the fœtus can be distinctly heard to beat in its parent's womb. What a precious discovery, and how inestimable its value in many cases in which the true condition of the female is shrouded in mystery—and how important, too, in instances in which, from pelvic or other deformities, the alternative of choice between the Cæsarean section or embryotomy may depend upon the solution of the question—Is the child alive or dead? The pulsations of the fœtal heart are not in accordance, or, in other words, synchronous with those of the maternal heart. While the maternal heart will average from seventy-five to eighty beats in the minute, the former will vary from one hundred and ten, to one hundred and sixty.* This latter variation in the fœtal pulsations, may be ascribed to some occasional disturbance experienced by the mother, in her circulatory and respiratory functions, and thus transmitted to the child through the influence of the changes in the maternal blood. After these pulsations have been once detected—and they are usually not recognised until between the fourth and fifth month—they will be found gradually to increase in force; but as the period of gestation approaches its close, there will be a marked diminution in their frequency. Cazeaux maintains the contrary of this; I think he is in error. Tyler Smith describes them

on suppurative action, the matter passing out through the rectum, in consequence of ulceration, as will sometimes happen in these cases. In addition to the enlarged ovary, I thought I discovered also, an enlargement of the uterus—and on making a vaginal examination, I very distinctly detected the ballottement. I at once pronounced the lady pregnant; her condition had never been suspected—her menstruation had been uniform and regular; and no vaginal examination had been previously made, for the reason that its necessity was not indicated. This lady was placed upon tonic treatment, with a view of meeting the waste from the constant discharge of matter. In four months after I saw her, she was delivered by Dr. Freeman of a healthy little girl, and what is extremely interesting entirely recovered her health.

* According to Frankenhauser, in the male fœtus the heart beats one hundred and twenty-four, and in the female one hundred and forty-four in a minute on an average.

as declining in frequency and continuous with the diminution which follows after birth.*

Auscultation.—The double action of the fetal heart—for in it, as in the adult, there are two distinct sounds, unequal in duration—is ascertained by means of auscultation. This, you are aware, is divided into *mediate* and *immediate*. In the former, the stethoscope is employed; in the latter, on the contrary, the ear is applied directly to the part at which the sound is sought for. It is quite evident that the fetal pulsations cannot readily be mistaken for any other species of vascular action, for the important reason that, on counting them, it will be found there is no correspondence in frequency between them and the throes of the maternal heart. In having recourse to auscultation, the patient may assume either the recumbent or standing position. It is not necessary to expose her person; the chemise may intervene—although the ear or stethoscope, applied directly to the naked abdomen, would be more likely to be followed by a successful investigation. The chemise should be made as smooth as possible, and perfect silence observed in the room; after the seventh month, the ear may be employed, if found desirable; but previous to this period, the stethoscope itself will be more advantageous. At what portion of the abdomen will the pulsations of the fetal heart be most frequently found? To answer this question it will be necessary to revert to what we have said, in a previous lecture, touching the relative frequency of the various presentations of the fetus.

The head is, out of all comparison, most commonly found to present with the occiput either in correspondence with the left or right acetabulum; the former constituting the first, the latter, the second presentation of the vertex.† In these respective presentations, you are to ask yourselves with what portion of the maternal abdomen is the spine of the fetus in relation, for it is to be borne in mind that the beats of the heart will be more easily detected by auscultating on the back than any other part of the fetal surface—and for obvious reasons, as suggested by Velpeau; in the first place, the natural curve of the fetal body is on its anterior plane, thus moving the cardiac region further from the abdomen of the mother, while at the same time the upper extremities are usually folded on the chest; and secondly, the anatomical relations between the spine and heart afford another motive for selecting the back of the fetus in this character of exploration. It, therefore, follows from what has been said of the relative frequency of cranial positions, that the back of the fetus will be found most commonly either on the left

* P. 143.

† The student should not forget what has already been said in regard to the change of the head, as indicated by Nægelé, from the right sacro-iliac symphysis to the right acetabulum.

or right lateral portion of the abdomen, at some point between Poupart's ligament and the umbilicus. Occasionally, however, in consequence of change in the attitude of the fœtus, the pulsations may be detected in various portions of the abdominal cavity. Of course, in pelvic presentations, the sound will be recognised in the upper portion of the uterus.

The facility for recognising the pulsations will be much enhanced by the escape of the liquor amnii; as soon as this passes off, the walls of the uterus coming in close contact with the body of the fœtus, there is, if I may so term it, a more positive *directness* given to the sound, and consequently an increased power of perception to the auscultator. In addition to the proof of pregnancy and the life of the child, these pulsations, when recognised, will also indicate the position of the fœtus *in utero*. If, in your exploration, you should hear the beatings of the fœtal heart in two distinct portions of the abdomen, the irresistible conclusion will be that it is a case of twin pregnancy; and again, after detecting the pulsations, if, on a vaginal examination, you should ascertain that the uterus has undergone but slight enlargement, it is very manifest that it cannot contain a fœtus, and, therefore, the gestation is extra-uterine. Sometimes, with the best directed efforts, and with all the skill you can bring to bear, it will be impossible to recognise the action of the heart, and yet the woman may be pregnant; and, at the full term, bring forth a well-developed and healthy child. So you see, gentlemen, that while the pulsations of the fœtal heart, once positively heard, constitute an unerring evidence that pregnancy exists, their absence is by no means a proof that the female is not pregnant.

4th. *Bruit Placentaire, Placental Souffle, Uterine Murmur*.—In 1823, Kergaradec called attention to what he denominated the *Bruit placentaire*—the placental souffle—a peculiar sound which he maintained was disclosed during pregnancy through auscultation, and which he attributed to the passage of the blood from the uterus into the placenta—the utero-placental circulation—and hence the name placental souffle. Since that time, however, although the general fact is almost universally conceded that a peculiar sound is emitted, yet authors differ as to its cause and seat. Some agree in opinion with Kergaradec, while others maintain that the sound is produced, not by the utero-placental circulation, but through pressure exercised upon the adjacent blood-vessels by the gravid uterus. Dubois restricts the cause and seat of the souffle to the circulation going on in the substance of the uterus itself. It is quite evident that the opinion of Kergaradec is not tenable, and, among others, for the following reasons:

1st. This sound is sometimes heard after the birth of the child, and expulsion of the placenta. 2d. It is not confined to any given

point of the uterus, but will be heard in almost every portion of its surface at different times. 3d. It will oftentimes be recognised when pregnancy does not exist, in cases of abdominal or uterine tumors. The uterus, during pregnancy, is in an extremely hyperæmic condition, the vessels are turgid with blood, and consequently the local circulation will be more or less labored; may not this be the simple explanation of the uterine murmur during gestation—and when it is heard after delivery, may it not be explained upon the hypothesis that the sudden emptying of the womb has left the vascular and other tissues of the organ in such a relaxed state, that the circulation, for a short period after parturition, continues to be sluggish, or, if you choose, labored, and hence the murmur? When you detect, through auscultation, the bellows sound in the heart, is it not accounted for on the principle that the circulation, through valvular or other disease, is interrupted in its ordinary round? But how, you may ask, is this souffle produced when pregnancy does not exist—in cases, for example, of abdominal or uterine tumors? I have no doubt it is the result of pressure upon some of the surrounding vessels. The hypothesis has obtained that the souffle may be occasioned by the peculiar condition of the blood in pregnancy, producing, as is sometimes the case in chlorosis, certain abnormal sounds. That distinguished physiologist, Dr. Brown-Séquard, supposes that these sounds in chlorosis occasionally emanate from a tremor of the muscles peculiar to weak and aged persons; and he has shown that there is a sound produced in the gravid uterus, which is generally mistaken for the placental souffle, and which is evidently due to the muscular sound; it co-exists with the local contractions of the uterus.

There is much diversity of opinion as to the particular period of pregnancy at which the souffle can be first recognised. Some say they have detected it at the eleventh week, others at the third month. But you will find, gentlemen, that these early periods, admitting there is no error, constitute rare exceptions to a very general rule. It is more, I am sure, in accordance with correct observation, to say that it is not until the expiration of the fourth month that it can be detected. The souffle differs in one important particular from the pulsations of the fœtal heart—it is synchronous with the maternal pulse, and, therefore, is connected with the blood-vessels of the mother. It possesses rather a coquettish propensity—after being once heard, it will sometimes bid defiance to the most accomplished auscultator, and will so completely intermit, that several days will often elapse before it again reveals itself. Occasionally, the whole period of pregnancy will pass without its ever being detected. From what has been said, it is manifest that its value as a sign of pregnancy is not of a high order, for it may exist where there is no gestation; and while its presence is no

indication of the life of the fœtus, it may be detected when the latter has ceased to live.

5th. *Pulsations of the Umbilical Cord*.—Dr. Evory Kennedy, who has written so well on the subject of utero-fœtal auscultation, says that he has been enabled distinctly to feel, through the abdominal walls of the mother, the convolutions of the umbilical cord, and also, by aid of the stethoscope, to hear its pulsations. But it has only been, he states, in cases in which the walls of the abdomen and uterus were characterized by unusual thinness. I have, after repeated attempts under the circumstances indicated by Dr. Kennedy, never succeeded in attaining either one or other of these objects. If the cord were distinctly felt, or its pulsations heard, it would certainly be unequivocal proof of pregnancy. But it seems to me that if the pulsations alone were detected, it would be difficult to demonstrate that they proceeded from the cord and not the heart, inasmuch as they, like those of the latter, are not in correspondence with the maternal pulse. It is true that the beatings of the cord might, from its extent, be heard in different portions of the uterine surface—but this, again, would be apt to give rise to the suspicion of Twin-pregnancy.*

* A *Fœtal souffle* is sometimes heard. Five instances, in five hundred cases of labor, have been reported by Scanzoni. The source of the souffle does not appear to be clearly established, but its presence is supposed to be indicative of danger to the fœtus.

LECTURE XIII.

Examination of the Female to Ascertain the Existence of Pregnancy—The Three Senses, Feeling, Seeing, and Hearing, to be employed—The "Toucher;" what is it?—External Abdominal Examination; its Objects; how to be conducted—Various Causes of Uterine Enlargement; how to be distinguished—Examination per Vaginam; Rules for—The Vagina; its Position and Relations—Position of the Female—Relation of the Vagina to the Cervix Uteri—Examination per Anum; when indicated—Retro-Version of Uterus—Prolapsion of Ovary into Triangular Fossa—Vaginal Ovariectomy—Auscultation—The Metroscope; its Uses.

GENTLEMEN—The examination of a female, for the purpose of ascertaining whether or not she is pregnant, requires on the part of the accoucheur, in the first place, a thorough knowledge of the various evidences of gestation, together with a full appreciation of the morbid phenomena known to simulate this condition; and, secondly, he must bring to the examination a facility of tact, which can only be acquired by a long and well-cultivated experience. To arrive at a just diagnosis on this subject will oftentimes constitute, from the complication of the surrounding circumstances, one of the most difficult duties in the entire curriculum of the physician's practice. But, great as is the embarrassment, it may be overcome by an enlarged knowledge and due attention.

In our discussion of the numerous signs of pregnancy, you will not have failed to notice that they are of different grades, and present various shades of value. The great majority of them are, to say the least, only equivocal, and will not, therefore, when any important interest, such as life or character, is involved in the decision, form data sufficiently broad to enable you positively to affirm that gestation exists. I admit that a married woman, especially if she have previously borne a child, will generally be enabled to understand that she is pregnant, from the symptoms which ordinarily accompany this state, such as the suppression of the catamenia, morning sickness, mammary sympathies, and other phenomena. But these signs, as they may be dependent on other influences than pregnancy, are utterly insufficient in numerous cases in which the counsel and judgment of the physician will be invoked, and upon whose opinion must depend all that is sacred to the individual.

The accoucheur, in his analysis of evidence, will have to bring into requisition the three senses, *feeling, seeing, and hearing*;

therefore, his means of exploration are divided in obstetric language into—1. The toucher; 2. The revelations made by the eye; 3. Auscultation. The adroit application of these resources, and a judicious appreciation of their deductions, will rarely fail in enabling the practitioner to evolve an opinion in accordance with the truth.

The *toucher* consists of an external and internal examination—in the former, it is restricted to an exploration of the abdominal walls; in the latter, the finger is introduced into the vagina or rectum, for the purpose of sundry investigations, to which we shall presently more particularly allude.

The *eye* is more especially employed in examining the state and peculiarities of the mammæ, while the *ear* is engaged in testing the various auscultatory phenomena.

1. *External Examination.*—In this examination, the chief objects are to ascertain whether there is any abdominal enlargement, and if so, on what it is dependent; also to recognise, if possible, the movements of the fœtus. If from distension of the uterus, the increased volume of the abdomen will usually be more or less in the centre of the hypogastric region, pyramidal in shape, with the base upward and the apex downward; and the enlargement will present to the touch uniform hardness, while on the sides there will be an absence of fulness, and the abdominal walls at these points will yield more or less to pressure. The upper portion of the pyramid will represent the fundus of the organ. By causing the abdominal muscles to relax, which can readily be done by flexing the thighs on the pelvis, and gently raising the head and shoulders of the woman, the hand is enabled to grasp the fundus; this will determine the point of its ascent in the abdominal cavity, and thus enable you to approximate, all things being equal, the period of pregnancy.

But, gentlemen, supposing the uterus to be distended, how do you know that it contains a fœtus? You will probably answer me, by means of the ballottement, quickening, or the pulsations of the fœtal heart. These phenomena, however, cannot be detected in the earlier months of gestation, and sometimes—although pregnancy may exist—the accoucheur fails altogether in recognising them during the whole period of the gravid state. Your diagnosis, therefore, must be determined by other circumstances; and this brings us briefly to consider the different causes, other than gestation, capable of inducing enlargement of the uterus. They may be enumerated as follows: A. Intra-uterine growths, including fibrous, polypoid tumors, and hydatids; B. Hydrometra, or dropsy of the uterus; C. Retention of the menses; D. Physometra, or a flatulent distension of the organ; E. Hypertrophy; scirrhus.

A. *Intra-uterine Growths.*—These, constituting pathological states of the organ, are usually accompanied by phenomena which, to the intelligent observer, will unmask their true character. For

example, in cases of an intra-uterine tumor, whether simply fibrous, occupying the entire cavity of the organ, or polypoid, and pediculated to a given point, there will almost always be hemorrhage with more or less bearing-down pain—the bleeding and pain generally increasing about the advent of the catamenial evacuation. Again: in these formations, the growth of the tumors is ordinarily slower, and in this way, too, they may be distinguished from pregnancy, which you know is rapid in its development, for the reason that there are but nine months allotted to the accomplishment of that *chef d'œuvre* of nature—the perfect organization of the embryo! Occasionally, when the uterus is enlarged from an intra-uterine growth, auscultation will reveal a souffle;* this may be mistaken for an evidence of pregnancy; but if this latter condition really exist, in addition we should recognise the pulsations of the fetal heart, together with the movements of the fœtus itself. Nor, in this connexion, should it be forgotten that these growths will sometimes coexist with pregnancy.

Pathologists are not of accord as to the special structure of these tumors; it has been generally said that they are composed of a fibrous tissue; recently, however, Lebert and C. Robin seem to have demonstrated that they consist of a simple hypertrophy of the fibro-muscular element of the uterus. Virchow is also of this opinion, maintaining that the fibrous or fibroid uterine tumor possesses in every respect the same structure as the walls of the hypertrophied uterus, consisting not only of fibrous connecting tissue and vessels, but also of muscular fibre cells.†

In *uterine hydatids* there will also be occasional bearing-down pains, and more or less discharge of blood; and, in addition, there is a symptom which I consider pathognomonic of these growths, viz. a periodical discharge of water per vaginam.

B. *Hydrometra, or Dropsy of the Uterus*.—In this affection the constitution is usually more or less involved, it being rarely a local disease; and, in percussing, distinct fluctuation will be revealed.

C. *Retention of the Menses*.—This is a most important derangement of the female, and has more than once resulted in false and cruel opinions, affecting not only the happiness, but leading from a broken heart to the death of the individual. Retention of the menses is that peculiar condition in which the menstrual blood is poured out regularly every month into the uterine cavity; through its accumulation, it gives rise to distension of the organ and certain sympathetic phenomena, which have sometimes been mistaken for pregnancy, and formed the basis of most erroneous decisions. See

* The souffle is not at all incompatible with an intra-uterine fibrous growth, for it may result from the fact of the tumor being situated over the aorta or other large vessels; and sometimes, also, the increased vascularity of the uterus may produce it.

† Virchow's Cellular Pathology, p. 443.

how easy a thing it is, by a careful examination, to arrive at the truth on this subject. Why is the catamenial fluid retained in utero? Simply because there is an obstruction to its free passage; and this obstruction may consist either of an occluded os tincæ or an imperforate hymen. Therefore, if either of these be found to exist, your diagnosis is at once arrived at.*

D. *Physometra*.—This is a rare affection; it consists in the accumulation of flatus within the cavity of the uterus, and I believe is almost always traceable to the extrication of gas from some decomposed substance within the organ—such as a retained placenta, mole, or fœtus. In *physometra*, there will be revealed, under percussion, a sound of distinct resonance, and the uterus

* Among several cases of retained menses in which I have operated, the following is not without interest: A respectable woman, the wife of a thrifty mechanic, married about six weeks, requested my professional advice. Her husband, a month after marriage, had begun to treat her cruelly in consequence of suspicious in regard to her fidelity. When I saw her, she had the appearance of being about five months pregnant; she remarked that some of the female relatives of her husband had impressed him with the belief that she was pregnant when he married her; hence his cruel treatment. The poor woman was in deep distress, and supplicated me to satisfy her husband that she had been true to him, assuring me, at the same time, that she would cheerfully submit to any examination I might suggest. She informed me that she was twenty-seven years of age, and had never menstruated; her health had been wretched from early girlhood. On visiting her the following day, I observed there was an indistinct and circumscribed fluctuation perceptible at the anterior portion of the abdomen, and extending upward within one inch of the umbilicus. The finger being introduced as far as the cervix, I soon appreciated an entire absence of the *os tincæ*, the lower and central portion of the cervix being quite smooth and uniform on its surface. With the other hand applied to the abdomen, I grasped the fundus of the womb, and thus embraced this organ between the hand externally, and the finger introduced into the vagina. The diagnosis was plain; viz. that the fluctuation was the menstrual blood contained within the uterus; in consequence of there being no outlet, this fluid had accumulated, causing a distension of the womb, and giving rise to the suspicion of pregnancy. I stated my opinion very fully to the husband—told him his wife could be relieved by an operation, at the same time assuring him that his suspicions were without the slightest grounds.

Having obtained his consent, assisted by two of my office pupils, Drs. Burtzell and Morris, I introduced a speculum into the vagina, and brought distinctly to view the cervix-uteri. This I penetrated at its lower and central portion. Soon, not less, I am sure, than two quarts of grumous blood were discharged from the uterine cavity. It is as well to mention that the perineal strait of the pelvis was somewhat contracted in its transverse diameter. The operation was attended with very little pain; the uterus assumed its ordinary size, and the patient recovered in a few days. I was much gratified with a visit from both herself and husband, the latter appearing truly contrite, while the former assured me of the happiness she experienced in being restored to his confidence and affection. Nearly thirteen months from the day of the operation, I was called to attend her in her confinement; after a severe labor of twenty-eight hours, I deemed it necessary to apply the forceps, and delivered her of a fine living son, assisted by two of my pupils, Messrs. Meriweather and Whipple, of Alabama.

will be found characterized by unusual lightness. Its volume, too, will be apt to vary in consequence of the occasional escape of flatus through the os tincæ. In addition, the antecedent history of the case will aid essentially in a correct diagnosis.

E. *Hypertrophy and Scirrhus of the Uterus*.—Here, too, the history of the case, besides the peculiar hardness of scirrhus imparted to the touch, will enable the practitioner to avoid all doubt.

I may also, at this time, mention some of the ordinary causes of abdominal enlargement, which might possibly, through unpardonable negligence, be mistaken for pregnancy—such as abdominal tumors without the uterus, whether simply fibrous, pediculated to the external surface of the organ, or in the form of a steatomatous mass, encysted dropsy, tympanites, ascites, etc., etc.

Abdominal Tumors.—Fibrous growths, attached by a pedicle to the outer portion of the uterus, are, according to my experience, by no means uncommon. Usually, there are several of them; their growth is sometimes rapid; most generally, however, slow. They are not malignant, and when they destroy life, they do so in consequence of their pressure on the digestive apparatus, so as to interfere with the healthy and necessary play of the nutritive functions. I have seen them from the size of an egg to the weight of thirty pounds. In my museum, you have examined several extremely interesting specimens of this character. These tumors are generally characterized by great mobility; and, under ordinary circumstances, they can be made, by judicious manipulation, to revolve slightly upon their axis, which consists of the pedicle by which they are attached to the external surface of the uterus; and if you gently press the ulnar portion of the hand downward, you will frequently be enabled to pass it between these tumors, showing at once their separate and individual existence, and also proving how entirely they are unconnected with increase of the abdomen, the result of gestation.

Enlargement of the Ovary.—An enlarged ovary has oftentimes given rise to the suspicion of pregnancy; and while, with proper attention, it is not difficult to make the necessary distinction, yet it must not be forgotten that occasionally this form of tumor coexists with, and constitutes one of, the complications of gestation.* In these latter cases, more than ordinary vigilance will be needed to elicit the truth. It would be proper to inquire whether a tumor had been observed in the abdomen for some time before the suspected pregnancy. But as a means of diagnosis in these cases, you will find auscultation, perhaps, the most efficient, provided you can succeed in detecting the pulsations of the fœtal

* For an interesting example of this kind, see *Diseases of Women and Children*, p. 258.

heart. In simple ovarian enlargement, you will discover, on inquiry, that the tumor commenced not in the lower and central portion of the abdomen, as is the case in enlargement of the uterus, but in one or other of the iliac regions; and for the very substantial reason that this is the location of the ovaries in their natural and healthy state. As the tumor increases in development, its ascent is more or less oblique; and, on a vaginal examination, the uterus will be found to have increased, if any, but very slightly in volume. Should it be a case of dropsy of the ovary, which is by far the most common form of morbid action assumed by this body—perussion will enable you to ascertain the fact, for fluctuation, more or less distinct, will be recognised. This form of dropsy is called encysted, because the fluid is contained in one or more cysts—in the former case, known as unilocular; in the latter, multilocular.

Tympanites.—The abdomen will not unfrequently become distended from a collection of flatus within the intestinal canal; and this is apt especially to occur in nervous, hysterical women. One of the prominent diagnostic evidences of this character of distension is the alternate increase and diminution of the volume of the abdomen—and this depends upon the quantity of flatus which escapes, either through the œsophagus or rectum. In these cases, too, the uterus will not be enlarged.

Ascites.—Ascites, or peritoneal dropsy, cannot well be confounded with pregnancy, if the following diagnostic guides be borne in mind: 1. It is the result of some previous derangement—such, for example, as inflammation, disease of the liver, kidneys, or heart; 2. In well-developed ascites, there is always more or less distinct fluctuation—and the fluctuation in this differs from that in hydrometra and encysted ovarian dropsy, in the important fact that it is not confined to any one portion of the abdomen, but is general; 3. The uterus, unless as a rare complication, will be found unchanged in size.

Phantom Tumors—Accumulation of Fæcal Matter.—In hysterical and anæmic women you will sometimes meet with what are termed phantom tumors, the pathology of which appears to be an irregular contraction and relaxation of the abdominal walls. A careful vigilance will prevent the possibility of mistaking these enlargements for pregnancy; so also with regard to the occasional distension of the abdomen from accumulated fæces.

2. *Internal Examination per Vaginem.*—It needs no little tact to conduct this examination in a manner at once acceptable to the patient, and profitable to the accoucheur. Indeed, I know of few positions more embarrassing to the young practitioner than to be called upon to institute this kind of exploration, without due knowledge and experience. It can scarcely be necessary, gentle-

men, to remind you that your patient is always entitled to a full measure of delicacy and refinement—it should never be forgotten that it is at a heavy sacrifice that she consents to have you by her side in the hour of her trial—and the richest equivalent, therefore, you can offer her for this sacrifice is the high-toned bearing, which every cultivated gentleman knows so well how to exercise toward a female under these circumstances.

You should accustom yourselves to conduct this examination with either hand, and whichever one you employ the index finger only is required. It should be extended fully, the thumb brought into



FIG. 43.

the palm of the hand, and covered by the other three fingers. (Fig. 43.) If you have a scratch or sore on the finger, never introduce it into the vagina, for you incur the serious hazard of inoculating yourself with the venereal poison, if any exist; or the absorption of acrid leucorrheal matter may prove disastrous. The finger should always be lubricated with some mucilaginous or oily material; what I find to answer every purpose is a little soap and water. Unless there be some personal or other objection to it, I usually prefer making this examination with the patient on her back, and in the recumbent position; the abdominal walls should be in a state of relaxation, as in the external examination, in order to facilitate the accoucheur in his manipulations—for, if they be tense and resisting, he will be unable to feel the uterus with the hand applied externally. A very proper and necessary precaution is, to precede the examination by causing the bladder and rectum to be evacuated of their contents. A neglect of this precaution will be apt to interfere more or less with the thoroughness of the exploration, and add no little to the discomfort of the patient.

Preliminaries to the Examination.—You are to remember that there is not the slightest necessity for, nor will any thing justify, the exposure of your patient. Your coat and shirt sleeve should be turned over at the wrist, and a napkin properly pinned over them, so as to protect you from any mucus or other secretions in the vagina—and besides, it is more in keeping with neatness and refinement, two attributes always appreciated in her physician by a delicate and cultivated female. How are you to find the vagina? This may appear to you a very unnecessary question—but, gentle

men, it is full of sterling import to you as practitioners. What would be the measure of your mortification if, in attempting an examination of this kind, the patient, after more than Christian forbearance, should exclaim, "Doctor, what are you about; do you not know better than that?" and you should discover that the rebuke was prompted by the painful circumstance that, instead of the vagina, you had introduced the finger into the anus! And yet, gentlemen, strange as it may seem to you, this blunder has been committed, for want of proper knowledge, much to the chagrin of the practitioner, and the outraged feelings of the patient. It is with a view, therefore, of guarding you against the possibility of such an error, that I shall proceed in a few words to point out in what way it may be avoided. The hand, arranged as I have already described, is to be placed under the sheet, and, without the consciousness of your patient, you should at once carry the index finger to the central and internal surface of the knee corresponding with the side of the bed at which you are sitting; then conduct the finger carefully along the median line on the internal surface of the thigh as far as the vulva; this will bring your finger to the central portion of either the right or left labium externum, and as soon as it has reached this point, all that is necessary will be to push the finger a little to the right or left, depending upon which labium it may be, and it is at once in the vagina.

Relations of the Vagina—Deductions.—As the finger passes into the vagina, always have its radial border looking toward the symphysis pubis. Now, before proceeding further, let us pause for a moment, and make one or two observations with regard to the shape and anatomical relations of the vagina. It is, you know, called the vulvo-uterine canal, because it extends from the vulva to the uterus, receiving, as it were, into its upper portion the cervix of the latter organ. The vagina posteriorly, in its three middle fifths, is in relation, through the medium of cellular tissue, with the rectum, giving rise to the recto-vaginal septum; anteriorly, it forms, through the same sort of intervention, a union with the urethra and bladder, thus constituting for the accoucheur two important septa, viz. the urethro-vaginal, and vesico-vaginal. In addition to these relations, it must be borne in mind that the vagina is a crooked canal, with its concavity forward, and its convexity backward; so that it corresponds with the curves of the pelvis, the upper extremity being parallel to the axis of the superior, while the lower is in relation with the axis of the inferior strait; the ordinary position of the uterus is such that its long axis is more or less in correspondence with the axis of the upper strait of the pelvis; and it, therefore, follows, that the junction of the upper portion of the vagina and cervix of the organ will form with the outer opening of the vagina an angle of about 45 degrees. The

object of my directing attention to these important facts is, that they may serve as a guide for the direction of the finger after it has reached the vagina. Without special attention to the subject, the young practitioner—I do not think I exaggerate it—in ninety cases out of one hundred, will, as soon as the finger enters the vagina, direct it from before backward! In doing this he will not succeed in reaching the os uteri, which is one of the important objects of his search, either in exploring for the evidences of pregnancy or at the time of labor—and hence his examination is without profit, he forms no diagnosis, and is stultified by his own ignorance! In carrying the finger from before backward, he reaches, not the os uteri, but the rectum—and if it should chance to be filled with masses of fecal matter, by pushing and poking—as he would be likely to do—it is not impossible that he might mistake the pieces of excrement for some anomalous condition of things—perhaps a presentation of the nates, supposing the movable lumps to represent the testes—and in his confusion, he would reveal his diagnosis, and request an immediate consultation!

In order, therefore, to avoid all error on the subject, as soon as the finger has passed about three inches into the vagina, the wrist is immediately to be depressed, and an opposite direction imparted to the finger—and for the obvious reason that, at first, the direction should be parallel to the axis of the inferior strait.

You will sometimes meet with cases in which the cervix uteri is situated so high up that it will be extremely difficult to reach it with the finger. Under these circumstances, you will find it good practice to examine your patient in the standing position; in this way, by giving the uterus all the advantage of gravity, the difficulty will generally be overcome.*

Well, you have reached the neck of the uterus—what next? You are now to ascertain its exact position; is it normal? Has it descended lower into the pelvic excavation than usual—is the os tincæ tumid and moist—is there any shortening of the cervix—is the body of the organ enlarged—does the enlargement indicate disease, or is it the result of pregnancy? Can you distinguish the fœtus by the ballottement? These, gentlemen, are so many inquiries which will necessarily present themselves to the attention of the accoucheur in conducting an examination with a view of ascertaining whether or not pregnancy exists.

I should have mentioned that, during this exploration, the other hand is to be applied to the abdomen of the female for the purpose of gently grasping the fundus of the womb, and thus judging of its volume and exact position in the abdominal cavity.

* In cases, also, in which, from disease or otherwise, the breathing of the patient becomes affected in the recumbent posture, she should be examined in the upright position.

The vaginal examination, if properly conducted, will reveal to the observant practitioner much interesting information, unconnected with the mere question of pregnancy. For example, he can ascertain the existence of pelvic deformities; the condition of the soft parts, whether normal or otherwise, and thus decide between a pathological and healthy condition of the parts he traverses with his finger. In one word, gentlemen, the examination per vaginam is a precious resource for the well-educated practitioner; it is a field rich with disclosures, which may serve as his guide in an infinity of ways.

3. *Internal Examination per Anum.*—Under certain circumstances, it may become necessary to examine the female per anum; for instance, in cases in which there may be exquisite sensibility, or much contraction of the vagina; where there are tumors developed in the posterior wall of the canal; or in cases of retroversion of the uterus complicating gestation; or where there has been prolapsion of the ovary or small intestines into the triangular fossa, bounded anteriorly by the posterior surface of the uterus, and posteriorly by the anterior surface of the rectum—sometimes called the recto-uterine fossa. This is a mode of examination extremely repugnant to the female, but, when indicated, it is fruitful in light to the practitioner.

You will sometimes be consulted by women, who will complain of extreme and painful pressure on the rectum, giving rise not only to great physical suffering, but oftentimes interfering seriously with the act of defecation. This pressure may arise from two very different conditions: either from retroversion of the uterus, or a prolapsion of the ovary into the triangular fossa. In either event, an examination per anum will greatly assist in elucidating the true nature of the case. The ovary, too, may be distended, exhibiting an example of encysted dropsy of the organ. Suppose such a case to complicate labor; you see how important it would be to arrive at a proper diagnosis, in order that prompt and efficient means might be devised to overcome the obstruction to the passage of the child. In such case, the remedy would be to perforate the ovary through the vagina, with a view of allowing the fluid to escape, and thus diminish the bulk of the tumor.*

4. *Auscultation.*—It has already been stated that the pulsations of the fetal heart and uterine murmur are to be sought through auscultation; and this is accomplished either by the ear or stethoscope. It requires much tact, patience, and experience to become an efficient auscultator. Nauch some years ago suggested an instrument—the metroscope—which he introduced into the vagina for

* On one occasion I performed the operation of vaginal ovariectomy in a young girl under extremely distressing circumstances. See *Diseases of Women and Children*, p. 297.

the purpose of detecting, as early as the third month, the fetal movement, and he also affirms that he has been able to satisfy himself with the metroscope of the important fact that the placenta is attached over the mouth of the womb. The instrument consists of a wooden tube flexed nearly at a right angle; one extremity is introduced into the vagina, and carried to the cervix uteri, while the other is applied to the ear. It can scarcely be necessary to remark that the metroscope has not met with much favor, and is now but little used.

LECTURE XIV.

Extra-uterine Pregnancy; its Varieties—Ovarian, Fallopian, Abdominal, and Interstitial—Characteristics of each Variety—Causes of Extra-uterine Pregnancy—Opinion of Astruc—Objections—Progress and Phenomena of Extra-uterine Pregnancy—Placenta and Membranes; the Germ inclosed in a Cyst—Exponent of the Uterus; Cyst; how formed—Cyst affords no Outlet for Fœtus—Rupture of Cyst from Increased Growth of Fœtus—Hemorrhage; how Produced—Enlargement of Uterus—Extra-uterine Fœtation rarely extends to the Fifth Month—Exceptional Cases—Secondary Cyst; how Formed—Signs of Extra-uterine Fœtation—Areola and Tumefaction of Breasts—Illustration—Active Movement of Fœtus; Cardiac Pulsations—Malpositions of Uterus from Position of Cyst—Intermittent Pain in Extra-uterine Gestation—Dangers of this Variety of Gestation—Hemorrhage from Rupture of Cyst—Peritoneal Inflammation—Terminations of Extra-uterine Pregnancy; Treatment—Gastrotomy; when Performed—Gastrotomy and Cæsarean Section—Fearful Hemorrhage in the Former; why—Section of Vagina—Elimination of Fœtus; how aided.

GENTLEMEN—When fecundation has been consummated, and the vitalized germ does not reach the uterus, it is because of some derangement, which has contravened nature; the development, therefore, takes place not within the uterine cavity, but at some point external to it; hence, this form of pregnancy is denominated *extra-uterine*. Pregnancy out of the uterus is unquestionably of rare occurrence in the human female; yet, on the other hand, there are well-authenticated cases, which give to the subject an interest well worthy the attention of the practitioner.* Authors have made numerous divisions which, it appears to me, are more calculated to perplex than aid the student in his investigation of the subject. In lieu, therefore, of arraying before you this long and varied classification, I shall content myself with presenting, for your consideration, four different kinds of extra-uterine gestation, which, for practical purposes, will embrace all that science properly recognises: 1. Ovarian; 2. Tubal, or Fallopian; 3. Abdominal; 4. Interstitial.

1. *Ovarian Pregnancy*.—When the embryo becomes developed in the ovary, it is called ovarian pregnancy; in reading upon this point, you will observe much discrepancy of opinion, arising out of the question whether it is possible for fecundation to take place before the rupture of the ovisac? Those who maintain that it cannot, deny the fact of ovarian gestation, for they say that true ovarian pregnancy is where the embryo becomes developed within

* This variety of gestation has also been observed in the rabbit, sheep, and bitch.

the ovary, and this can only occur by the spermatozoon penetrating the ovisac, without disturbing its integrity, and vitalizing the germ. But, as they contend that this mode of fecundation cannot be accomplished, they reject, as a consequence, the possibility of ovarian gestation. Now, gentlemen, it is very evident that this is a mere play of words; it is a species of transcendental logic, which is not calculated either to advance the true interests of science, or subserve the requirements of the physician who, in questions of this nature, is in want of well-established facts, unaccompanied by any of the refinements of the sophist, or the theoretical niceties of the disputant. What you wish to understand is simply this—is it possible for the fecundated germ to become developed, so as to constitute, in truth and in substance, an ovarian pregnancy? The fact is proved beyond all peradventure, for the fœtus has been found, in a state of progressive growth, in intimate relations with the organ; so that the question is not whether the development is *within* or *without* the ovisac, but whether, not occurring in the uterine cavity, it is possible for it to take place in connexion with the ovary. I repeat, science furnishes well-authenticated examples of this species of extra-uterine gestation.*

2. *Tubal or Fallopian Pregnancy.*—This has usually been regarded the most frequent form of abnormal pregnancy, and is said to bear to the others the proportion of nine to three. Prof. Hecker has recently shown, from carefully collected tables, that this is not so.† For example: in all the cases of extra-uterine fœtation, which he has been enabled to gather from various sources, he has ascertained that, while abdominal pregnancy occurred in one hundred and thirty-two instances, the fallopian variety was observed only sixty-four times. These sixty-four cases, with one exception, terminated fatally; the exceptional example has been reported by Prof. Virehow. It is also interesting to note that Hecker's researches have fully confirmed the opinion, which has for a long time prevailed, viz. that fallopian pregnancy is more frequent in the left than in the right tube.‡ According to his record, it occurred thirty-seven times in the former, and only twenty-seven in the latter. It should be remembered that, under the term abdominal, Prof. Hecker includes also, ovarian gestation.

* An interesting case of ovarian gestation has recently been recorded by J. Hall Davis, M.D., in which the left ovary was developed into a cyst, and contained a decayed fœtus. [Transactions of the Obstetrical Society of London, 1860, p. 241.]

† *Monatsschrift für Geburtskunde*, 7—cf. 1859.

‡ Dr. Finnell, of New York, reports in the *New York Journal of Medicine* for March, 1857, an interesting case of fallopian pregnancy on the *right* side. The same gentleman has recently met with a second example of the same variety of gestation also on the *right* side. Few medical men in this country have enjoyed more extended opportunities of pursuing autopsical examinations than Dr. Finnell, as his numerous reports to the New York Pathological Society will show.

3. *Abdominal Pregnancy*.—In this case, the germ becomes deposited in some portion of the abdominal cavity, and passes through certain stages of development; the surest guide as to the particular part of the abdomen in which the development progresses, will be the attachment of the placenta. This has been variously found on the broad ligaments, in the recto-uterine fossa, on the mesentery, in the iliac fossæ, on the internal surface of the anterior wall of the abdomen; in a word, more or less on all the abdominal viscera. I might cite well-accredited instances of these different points of attachment of the placenta, but, as they are generally accepted as truths, I scarcely think it necessary to consume time in their narration. According to Prof. Hecker, there is a very marked difference in the mortality of this and the tubal species; while in the latter, one in sixty-four survived, in the former, among one hundred and thirty-two cases, there were only fifty-six deaths, giving a mortality of but forty-two per cent.*

4. *Interstitial Pregnancy*.—The embryo here is developed neither directly under the peritoneal nor mucous coverings of the uterus, but becomes located in the meshes of the muscular fibres of the organ, and there receives its growth. The question naturally arises, how is it conveyed to that particular portion of the uterus, and become embedded in the midst of its very substance? Several hypotheses have been advanced to explain the circumstance, but they are as yet simple hypotheses, without the support of any reliable data. It was the opinion of Breschet—who in 1824 was the first to describe this variety under the form *graviditas in uteri substantia*—that the embryo, as it passed into the uterus, fell into the opening of some of the venous sinuses, which he supposed to exist near the uterine extremity of the fallopian tube, and thus found its way into the substance of the organ. But repeated attempts have failed to discover these sinuses, and, without the proof of their existence, it is in accordance with true philosophy to doubt their reputed functions. Only twenty-six cases of this species of extra-uterine fœtation have been recorded; it is as fatal as tubal gestation, and, like this latter, it was observed more frequently

* A very remarkable example of extra-abdominal pregnancy has been reported by Dr. Geuth. The female, from early childhood, had a small movable tumor at the external abdominal ring. After marriage, she had borne three children. Some time after the birth of the third child, the catamenia ceased, and the tumor began to enlarge. Sixteen and a half weeks after the menstrual suppression, the tumor equalled the volume of two fists; it extended, by a pedicle, into the inguinal canal. The patient suffered greatly, and became much enfeebled. The tumor was laid open, and contained a fœtus and placenta of between four and five months. The patient recovered, and has subsequently become pregnant. Dr. Geuth's opinion is that this was an instance originally of hernia of the ovary and fallopian tube, and that pregnancy occurred without the abdomen. [Verh. der Ges. für Geburtsh. Berlin, 1855.]

on the left than on the right side, in the proportion of seventeen to twenty-four.

Causes of Extra-uterine Fœtation.—Various theories have been advanced in explanation of extra-uterine gestation. It was contended by Astruc that it is much more frequent in widows and unmarried women.* Upon this assumption he proposed the theory, that oftentimes fright, from being detected in the very act, determined the *error loci* of the germ. But how, with this hypothesis, are we to understand the occurrence of extra-uterine fœtation in married women, who have not only a right to be pregnant, but are most anxious to become mothers, and who, therefore, so far from experiencing alarm or mental emotion, enter into the act of intercourse with all the earnestness and pleasure, which an honest conviction of right can inspire? Again: how is it consistent with the well-known fact that some married women become pregnant, and bring forth healthy living children without the slightest approach to anything abnormal, to whom sexual intercourse is most repugnant, and whose constant hope is that they may not prove mothers? Is it not reasonable to suppose, that in these there would be strong mental emotion, bordering on well-developed fright, at the time of cohabitation?

In my opinion, a more plausible explanation is found in the theory, which, I believe, was first proposed by Prof. Virchow. He has observed that this form of pregnancy is frequently accompanied by adhesions of the internal genital organs, caused by false membranes; these adhesions are mostly on the left side. He, therefore, attributes to their presence an important influence in the production of the pregnancy itself, and also explains why it is that extra-uterine gestation is more frequent on the left than on the right side. It may be mentioned, *en passant*, that adhesions of this kind are sometimes the real, but occult cause of sterility.

Progress and Phenomena of Extra-uterine Fœtation.—In a practical sense, it is essential for you to understand the progress and phenomena of this species of pregnancy, in order that you may be prepared, when it occurs, to render the necessary assistance to your patient. The development of the fœtus and its appendages proceeds nearly in the same manner as when the germ is located in the uterus, although, as a general rule, the cotyledonous element or lobes of the placenta are more abundant. In closely examining an extra-uterine fœtation, you will be able to recognise the chorion and amnios; the uterus is more vascular, its fibres and mucous covering are in a hypertrophied state, and the entire organ notably enlarged.

It is an interesting fact, and in strong illustration of the harmony

* Experience proves that extra-uterine pregnancy, in the majority of cases, occurs in women who have previously borne children.

of principle which characterizes the operations of nature, that very soon after the passage of the fecundated germ to whatever part of the maternal organs is to constitute the seat of its growth, there will be observed in that part an increase in the action of the blood-vessels; this, no doubt, is owing to the vital activity, which is so marked in the ovule as soon as fecundation has been accomplished. So true is it that the vessels become congested, through an afflux of fluid necessary for the wants of the embryo, that if, from accident or otherwise, these vessels should become ruptured, a fatal hemorrhage may ensue even in the very first few weeks of the gestation.

The germ is inclosed in a species of cyst, which is composed differently in the different classes of extra-uterine fœtation. For example, in ovarian pregnancy, the cyst is made up of the fibrous and serous tissues of the ovary itself; while, in tubal pregnancy, it consists of the muscular tissue of the tube, in conjunction with its peritoneal tunic. In abdominal pregnancy, on the contrary, the cyst is composed almost exclusively of an exudation which, from its plastic character, forms a bond of union between the ovum and the surface with which it may be in contact. The cyst represents the uterus; but, unlike this organ, it has no outlet for the passage of the fœtus into the world; and this is even so in fallopian pregnancy, for, in this case, the tube will be found obliterated on each side of the cyst. As the embryo increases in development, one of the dangers to be encountered is the rupture of the cyst, which often results in the death of the mother from hemorrhage, and it is not, I think, improbable that this may sometimes be the real, but concealed cause of death, in cases in which females, in apparently good health, suddenly sink.

In extra-uterine pregnancy, the uterus, as said before, undergoes more or less enlargement; and this circumstance occasionally complicates the diagnosis. Frequently, in consequence of the increased vitality of the lining membrane of the organ, the *membrana decidua* will be recognised. It is comparatively rare that this variety of gestation reaches its full term; it seldom passes beyond the fifth month, although sometimes it attains the ordinary period; and there are instances recorded of its duration continuing many years. In these latter cases, the fœtus is found in a degenerated state—it is either exsiccated and shrivelled, or will present a stony hardness, and sometimes a mere mass of adipose or fatty matter. The degeneration into a stony hardness is more apt to occur in cases of abdominal pregnancy, and then, as also when the fœtus is dead in utero, and becomes converted into a calcareous mass, it is called *lithopœdion*. Even when the gestation reaches the full time, it is extremely rare for the fœtus to be alive—it almost always dies from want of sufficient nutrition.

I have told you that rupture of the cyst, containing the fœtus, is usually followed by fatal consequences—this, however, is not always so; occasionally, after the escape of the embryo through the rupture—if the patient survive the hemorrhage—she may sink from peritoneal inflammation, which is extremely apt to follow the egress of the fœtus from the cyst. Should, however, the inflammation be subdued by prompt treatment, then there will generally be the formation of what is called a *secondary* cyst, in which the fœtus becomes inclosed, and which is the product of the exudation consequent upon the inflammatory action.

The fœtus, thus embraced within its secondary cyst—and the same thing may occur while in its primitive envelope—will, sometimes, from its weight, or other circumstances, cause inflammation, which may result not only in its own destruction, but also in that of the cyst, involving the neighboring parts in more or less ulceration, so that there may follow a fistulous communication externally, either through some portion of the abdomen, rectum, bladder, or vagina, and through this opening, the fœtus, in a state of decomposition, may be discharged fragment by fragment. This result is likely to compromise the life of the mother. It is, indeed, stated that portions of the embryo have been ejected by vomiting from the stomach. If, therefore, in the course of your practice, you should be called upon to give an opinion as to the possibility of the passage of foetal fragments, through the channels mentioned, you can, without hesitation, state that such a condition of things may result from an extra-uterine pregnancy in the manner indicated.

Symptoms and Diagnosis of Extra-uterine Fœtation.—How are we to know that extra-uterine pregnancy exists? Here, as in uterine-gestation, we have nothing specially to guide us in the commencement; menstruation may or may not become interrupted; in the only case of extra-uterine gestation, which has fallen under my personal notice, in which I was consulted by Dr. Cyrus M. Thompson, of the State of Maine, the same phenomena occurred in the breasts, which are usual in ordinary uterine gestation, and the areola, especially, was fully developed with its characteristic attributes. The abdomen was more or less enlarged, but there was no suppression of the menstrual evacuation.* It is maintained,

* This was the case of a lady, who married when she was thirty-three years of age. During her maidenhood she enjoyed excellent health, and continued to do so for a year after marriage; at this period, however, she suffered more or less from derangement of the system; her abdomen enlarged, the breasts became tumid, and there was nausea with occasional vomiting. Her menses were quite regular, both as to time and quantity; she had a cough, with purulent expectoration, and a pulse at 110. It was under these circumstances that she visited the city of New York, bringing with her a letter from her family physician, Dr. Thompson, who requested

by some writers, that the breasts undergo no change in this form of pregnancy, and that there is no secretion of milk. I cannot understand on what this opinion is founded. The phenomena, con-

my opinion as to her case. The doctor had fully made up his mind as to the broad meaning of the cough, purulent expectoration, and accelerated pulse—they were the unmistakable evidences of a serious trouble, which had already marked this lady as a victim to that relentless enemy of our race—consumption. She, however, did not appear at all conscious that the cough indicated any such fatal issue, and her whole attention was concentrated upon the abdominal enlargement. Her own conviction was that she had a tumor, which would destroy her life; she did not believe it possible she was pregnant, for the reason that her menstrual flow was regular. I made a very critical examination of the case, and soon became convinced of two facts: First, that the uterus was enlarged, corresponding with a three months' gestation; second, that commencing in the left iliac fossa, and extending obliquely upwards in the direction of the right hypochondriac region, there was evidently a growth independent of the uterus.

On inquiry, the lady informed me that, just six months before I saw her, she commenced to experience irritability of the stomach, and there was also an increase in the size of the breasts. Soon after this, she felt a sense of pain in the abdomen, which has continued more or less at intervals, and which, within the last two or three weeks, had occasioned her not only much physical distress, but caused a great deal of mental anxiety, from the apprehension that she labored under some serious affection, which would destroy her life. Here, then, were two conditions, which, on examination, I had distinctly recognised, viz.: In the first place, an enlargement of the uterus; and, secondly, an enlargement of the abdominal cavity altogether independent of the uterine development. What could this latter be? A very natural presumption was—that it might be an ovarian tumor. During my manipulations on the abdomen, I very distinctly felt a movement—at first I was not quite satisfied of its nature. I again recognised it, and so distinctly, that it could not be mistaken—it was evidently the movement of a *fœtus*. I then had recourse to auscultation, and, after some time, the pulsations of the *fœtal* heart were detected; the sounds were emitted about two inches above the umbilicus, and to the right. There was no mistaking them. My pupil, Mr. F. B. Bates, a relative of the lady, heard them, and also recognised the movements of the *fœtus*. From the point of the abdomen at which the pulsations were detected, I came to the conclusion that the breech presented obliquely downward corresponding with the left iliac fossa. Here, then, was clearly a case of pregnancy. What was its true nature? It was quite obvious that it was not a case of uterine gestation, for this organ, although enlarged, had not yet left the pelvic excavation. I decided, after a full consideration of all the circumstances, that it was unequivocally an example of extra-uterine gestation. I have already observed that the areola was well marked, presenting its true characteristics.

In reply to the most anxious inquiry of the patient regarding her condition, I told her she was pregnant, but concealed the fact of the peculiar variety of gestation under which she labored. I was unwilling to add anything to her cup of sorrow, which was already full to overflowing; and more especially as I had good reason to believe that the period of her dissolution was near at hand. She appeared delighted with the opinion, and returned home joyous and happy, little dreaming of the sad future, which was so soon to remove her from earth! In all truth, she verified those trite but expressive words of the poet:

“When ignorance is bliss,
’Tis folly to be wise.”

I gave my opinion to Dr. Thompson in writing; and I received a letter from him,

sequent upon ordinary gestation, are entirely sympathetic, resulting from the changes going on in the uterine organs; and these sympathetic phenomena are the results of that close alliance, which is known to subsist between the breasts, the uterus, and its appendages. It does seem to me, that the fire, so to speak, kindled in these appendages and in the uterus itself—for we have seen that it also undergoes increase of volume—is sufficient to evoke corresponding excitement in the mammæ.

As I have already mentioned, the fact of the enlargement of the uterus tends to complicate the diagnosis; but in extra-uterine pregnancy, besides the increased size of the organ, there will be discovered on one or other portion of the abdomen, usually on the side, an enlargement, and the patient will occasionally complain of a sense of pain at that point. Here, again, this may be confounded with a tumor of the ovary, or a tumor of some other description.

It is obvious that, for the first three or four months of extra-uterine fœtation, there is nothing to guide us in the expression of a positive opinion as to its existence; and the only means of arriving at a just decision will be the active or passive movements of the fœtus, and the cardiac pulsations. These, well recognised, place all doubt at an end. I should mention that, although the uterus increases in volume, yet it does not exhibit the changes which we have described as characteristic of uterine gestation. For example, the cervix does not undergo any sensible diminution in its length, nor, under ordinary circumstances, does the position of the cervix tend backward toward the sacrum, as we know is the case in true gestation, in proportion as the uterus ascends in the abdominal cavity; and, moreover, by a proper abdominal examination, you will be enabled to recognise whether the tumor is the enlarged uterus; but all doubt upon the subject will be dissipated by placing the finger of one hand on the cervix, and the other hand on the abdominal portion of the tumor, thus completely grasping it

two months afterward, announcing the death of his patient, under the following painful circumstances: On her return home, she rallied for the first week or two—her whole thoughts being occupied with the happy anticipation of soon becoming a mother; she quickly, however, relapsed into her former condition—the cough increasing, the pulse reaching 130, with copious expectoration and great loss of flesh. Just one month from the time she left New York she was attacked with profuse hæmoptysis, which was followed by profound prostration: the hæmoptysis again recurred in two weeks, and two days afterward she sank from exhaustion. The following is a brief extract from the doctor's letter:

"In a post-mortem examination, your diagnosis of this case was fully confirmed. There was an extra-uterine fœtus, apparently about seven months developed. It was partly decomposed, having, I have no doubt, succumbed a few days before the mother. There was about a pint of blood in the peritoneal sac, which must have added greatly to the prostration of our unfortunate patient. As far as I could determine, it was a case of ovarian extra-uterine pregnancy."

between the two hands; and, in this way, you can readily detect, by an alternate movement of the hands, whether it be the uterus or something foreign to it.

The particular position of the cyst, inclosing the fœtus, will sometimes exercise an important influence on the position of the womb; and this should be borne in mind, otherwise it might lead to the embarrassment of mistaking extra-uterine pregnancy for simply a displacement of the uterus. If, for example, the cyst should attach itself posteriorly to the uterus, in the recto-uterine fossa, for instance, it might possibly be mistaken for retroversion of the organ. But, a moment's thought on the part of the practitioner, together with a vaginal examination, would soon reveal the error. The fundus and body of the uterus, instead of being retroverted, would be in directly an opposite condition; they would be pushed forward, constituting what is known as an anteversion; and the cervix, in place of being forward, as is the case in retroversion, would be turned backward; this malposition would be apt also to produce more or less irritation of the bladder.

The presence of the cyst in the recto-uterine cavity might mislead you in other respects in your diagnosis; for, we have elsewhere remarked, that this fossa is occasionally the seat of a prolapsed ovary, or of a portion of the small intestines. But adequate care in your examination, with a knowledge of the antecedent circumstances, will generally avail in enabling you to arrive at a correct opinion. Moreover, those who have recorded examples of this peculiar location of the cyst, say, that on an examination per vaginam or anum, the fœtus can be recognised by the sense of touch. Suppose, however, the cyst should occupy a reverse position, and be found just in front of the uterus. The result, in this case, would most likely be retroversion of the uterus, and more or less vesical irritation; this latter would be the effect of two forces—in the first place, the presence of the cyst; and, secondly, of the neck of the uterus, which, in retroversion, would be found turned toward the lower extremity of the bladder.

The female, in extra-uterine pregnancy, will, at different periods, experience more or less pain, marked by distinct intermittence. When the cyst is composed of muscular fibres, as is the case in interstitial, fallopian, and ovarian gestation, these pains will closely simulate labor pains, and are the result of the contractions of the muscular tissue of the cyst. The uterus itself often participates in these contractions, and adds to the severity of the pain.*

* Professor Hohl reports an interesting case of abdominal pregnancy, in which he recognised the contractions of the cyst. The cyst was behind the posterior cul de sac of the vagina, and near the posterior wall of the pelvis. He could distinctly feel it, and during the pains, the contractions of the cyst were quite apparent. After death, there were many organic muscular fibres detected in the coat of the ovum.

The Dangers of Extra-uterine Foetation.—Let us now, gentlemen, briefly examine in what chiefly consist the true dangers of extra-uterine foetation. It is an important question, and embodies some interesting practical bearings. It has already been remarked to you, that this form of gestation may terminate in one of two ways: First, In rupture of the cyst, which is generally the result of the increased development of the foetus, although not always so, for the laceration may be caused by blows, falls, etc.; Secondly, In the death of the foetus, the sac remaining undisturbed. These, I believe, may be said to be the two ordinary modes of termination of this species of gestation; and there are consequences to the mother growing out of each, which it is essential for the practitioner to appreciate. In very rare instances, the mother escapes the usual fatal consequences of rupture of the cyst, because of the formation of what is known as the secondary sac, the nature of which we have already explained to you. But the immediate danger of the rupture is death from hemorrhage; and fatal results ensue in at least two-thirds of the cases in which rupture takes place. The laceration is usually preceded by pain in some point of the abdominal cavity, quickly followed by symptoms of marked prostration—cold extremities, pallor of countenance, clammy perspiration, vomiting, and flickering pulse. This may occur at any period of the pregnancy, even in the first month. In these cases, a post-mortem examination will reveal more or less effusion of blood in the peritoneal cavity—the effusion being the result of the rupture of the blood-vessels immediately concerned in the development of the foetus and its annexæ. Should, however, the female escape the ordinary consequences of rupture, she incurs the serious peril of peritoneal inflammation, caused by the irritation of the foetus on the serous lining after it has left the cyst. So you see, the two immediate dangers of rupture of the sac are: 1. Death from hemorrhage; 2. Death from inflammation.

If, however, the cyst be not ruptured, the foetus may continue to live to the completion of the full term of gestation, which fact will be recognised by its movements and the pulsations of its heart; or it may have perished, and still continue to be inclosed in the sac. In either case, as has already been stated, there will be intermittent pains simulating the throes of labor, but altogether ineffectual so far as the expulsion of the foetus is concerned. It, therefore, results that the foetus may sojourn in the system of the female, and its presence give rise to the following conditions: 1. It may destroy the life of the mother by inflammation; 2. By the derangement which its presence and pressure may occasion in the digestive and other functions; 3. By its decomposition, and passage from the maternal system, through the vagina, rectum, abdomen, bladder, etc., as have already been indicated; 4. It may degenerate into a

stony, shrivelled mass, and remain for many years in the system, without resulting in anything serious.

Treatment.—With this brief review of the principal circumstances connected with extra-uterine pregnancy, the question has, I have no doubt, suggested itself to your minds—What can be done in these cases? Does science afford us any means of relief? These questions, gentlemen, concern us as medical men deeply; for the great object of our profession is to arrest, if possible, the shaft of death; and when we fail in this, to do all in our power to soothe the anguish of human suffering, and make as light as may be the progress to the grave. We will suppose that your diagnosis as to the existence of extra-uterine pregnancy is either beyond all peradventure, or that it is a matter of great doubt.* In the latter instance, to attempt any plan of treatment would be the sheerest folly, for the substantial reason that there can be no indication as to any special medication, as long as you are ignorant of the true nature of the case. You would not, I imagine, deem it wise, because a patient complains of pain in the chest, to take it for granted that the pain is necessarily the result of pneumonia or pleurisy, and, therefore, plunge your lancet into the arm and abstract blood *ad deliquium*!

But we take the former example—the proof of the pregnancy is positive. In this case, some very nice considerations present themselves: First, the mother's life is placed in great jeopardy, in the various ways already indicated; Secondly, The death of the fœtus is reduced almost to a moral certainty. These, then, are the naked and indisputable dangers of an extra-uterine pregnancy, if left to pursue its own course;† and the important question for the practitioner is—Does science possess any alternative by which the danger to the mother may be lessened, or the chances of safety to the child increased?

I assume, as a fact, amply sustained by the experience of the profession, that, as a general rule, the certainty of extra-uterine gestation cannot be arrived at before the period of quickening;

* Some grave errors have been committed with regard to the existence of this form of gestation; a case which occurred in Berlin is not without its moral: In August, 1828, Dr. Heim, who, with other eminent gentlemen, had agreed that a patient was the subject of extra-uterine fixation, requested Prof. Dieffenbach to perform the Cæarean section. The operation was accordingly performed, but to the amazement of all present, there was no pregnancy of any kind. The woman, however, fortunately recovered. [Dr. Heim's *Vermischte Medicinische Schriften*, p. 402. Leipzig, 1836.]

† It has recently been suggested by Dr. Bachetti, of Pisa, to attempt the destruction of the embryo at an early period, so that the mother may be protected from harm, through an arrest of its development. He records a case of this kind in which he succeeded in his object by electro-puncture. He implanted two needles into the tumor, and then directed into the latter an electro-magnetic current. [*L'Union Médicale*, p. 168. 1857.]

therefore, anterior to this period, the question of treatment will not usually arise. There is a difference of opinion as to the course to be pursued after the life of the child has been fully recognised. Some recommend gastrotomy, which consists in an incision of the abdominal walls for the purpose of extracting the fœtus, and thus equalizing the chances of life between it and its parent. Now, this is a mode of procedure which should not be resorted to without deliberate reflection, and its justification based upon the reasonable assurance that, taking all the surrounding circumstances into consideration, it presents the greatest chance of safety to both mother and child.

There is one special danger in the operation of gastrotomy in extra-uterine pregnancy, which does not apply to the Cæsarean section in uterine gestation, and it is this: In gastrotomy, besides the dread of inflammation and shock to the nervous system—common to it and the Cæsarean operation—*there is the cardinal danger of hemorrhage*, and for the following reason: As soon as the cyst is opened, and the integrity of the blood-vessels encroached upon, profuse bleeding ensues—the cyst, especially in abdominal extra-uterine pregnancy, possessing comparatively such slight power of contraction, for the reason that its muscular tissue is not abundant; in the Cæsarean section, on the contrary, the uterus speedily contracts, and arrests the flooding.* The records of gastrotomy, the child being alive, are certainly adverse to the operation, for it has almost always proved fatal.

If, however, you should have decided that the extraction of the fœtus is justifiable, it may sometimes happen that it will be more advisable to make an incision into the vagina, and remove it through this passage; and this will be more particularly indicated in cases in which the fœtus can be felt distinctly pressing down upon the vagina. Should the head present, the child may be delivered after the incision, by means of the forceps or version, as occurred in the practice of Dubois. He felt the head of the fœtus through the vagina—made an incision into the vaginal wall, and also into the cyst, with a view of terminating the delivery by means of the forceps. He soon found, however, that there were firm and resisting adhesions between the head and sides of the cyst, which caused him to abandon the operation. In the course of a few days an extremely putrid odor was emitted through the opening, and the fœtus, having undergone decomposition, came away in fragments; the bony structures being aided in their passage by means of small pincers, and repeated tepid injections. The mother was convalescent in two months from the time of the operation.

* In the interstitial and fallopian varieties of extra-uterine fœtation, the cyst is supplied with muscular fibres—in the former, from the uterus itself; in the latter, from the muscular coat of the tube.

There is another condition in which the operation of gastrotomy may be resorted to. Suppose, for example, after having carried the fœtus beyond the ordinary term of gestation, the mother should manifest much suffering from its presence, and her health exhibit evidences of approaching decline from this cause. Under these circumstances, the question would legitimately arise whether it would not be advisable to extract the fœtus for the purpose of increasing the chances of life to the mother. Here, again, gentlemen, it is but a question of expediency, which is to be determined by sound judgment, and with but one motive to govern that judgment, viz. the greater welfare of the parent. I might here mention that Mr. Adams, of the London Hospital, and Dr. Stutter, of Sydenham, have recently succeeded, by gastrotomy, in the extraction of dead extra-uterine fœtuses, several weeks after the completion of the full period of gestation. In both instances, the mothers survived.*

Should you discover, at any time, an incipient abscess in the abdomen, vagina, or rectum, etc., occasioned by the death and decomposition of the fœtus, I need not tell you that it should be promoted by warm fomentations, and, if necessary, opened, so that a passage may be afforded to the fœtus; and its extraction assisted by the various instruments necessary for the purpose. Dr. Campbell, † in an excellent memoir on the subject, presents some interesting details. He says it is well proved by experience that, when the suppurative process is established, or a breach is actually formed in the parietes of the abdomen, the integuments may, with safety, be largely incised or the pre-existing aperture freely dilated with success. He records thirty cases in which gastrotomy was performed, or the breach dilated, and of these, twenty-eight recovered. In twelve cases of gastrotomy, resorted to after the suppurative process was well advanced, ten were successful. In nine cases operated on, when the fœtus was still alive, or soon after its death, all were fatal.

* Medical Times and Gazette, London, July, 1860.

† A Memoir on Extra-uterine Gestation. Edinburgh, 1840.

LECTURE XV.

Pregnancy, although not a Pathological State, is occasionally subject to Derangements—These Derangements are both Physiological and Mechanical; Illustration—Dogmatical Doctrines of the Ancients in regard to the Therapeutics of Pregnancy—Bloodletting in Pregnancy; when Indicated—Cathartics and Emetics; are they admissible?—Nausea and Vomiting; how Treated—When Excessive—Ptyalism—Constipation—How Constipation is caused in the Pregnant Female; in part through Morbid Nervous Influence; in part from Mechanical Pressure—Diarrhoea; its Dangers—Palpitation of the Heart and Syncope—Larber's Opinion respecting Hypertrophy of the Heart—Pain in the Abdominal Muscles; how Treated—Painful Mammæ—Pain in the Right Hypochondrium—Pruritus of the Vulva; Hemorrhoids; how Produced—Varicose Veins—Cough and Oppressed Breathing.

GENTLEMEN—I have remarked, in a previous lecture, that pregnancy cannot, strictly speaking, be regarded as a pathological or diseased state. But while this fact is conceded, yet, on the other hand, it is not to be forgotten, that many of the sympathetic phenomena characteristic of gestation will sometimes, through exaggerated action, assume a morbid character, calling for the intervention of science. Indeed, the derangements of pregnancy may, with propriety, be divided into physiological and mechanical. Do not misunderstand me; a true and complete physiological action is nothing more than a natural function, and while it keeps within the particular sphere of duty assigned to it in the mechanism, it cannot, by any construction, be denominated morbid. It is only when the physiological function ceases to be recognised by nature as a sound link in the chain of forces, which make up the entire workings of the system in health, that it becomes converted into a pathological result.

Let us illustrate this point. You know very well, that the important office of the kidneys is to secrete urine, through which effete matter is more or less constantly passing from the system; so long as this secretion is performed normally, it constitutes a necessary and precious element of health. But, suppose that, in lieu of the ordinary action of the kidney, there should be an increased secretion of urine, giving rise to that dangerous, and oftentimes fatal malady—diabetes. In this case, we should clearly have substituted a pathological state for what, under ordinary circumstances, is strictly a physiological function. The same thing occurs frequently in pregnancy. For example, there is scarcely a sympathy evoked in the economy as the consequence of fecundation,

which may not, in the manner just described, become morbid, and thus need the attention of the practitioner. Again: as the result of mere mechanical pressure, there may occur various phenomena, which, from their disturbing influences, are entitled to be termed morbid, and which, therefore, are legitimately objects of medical treatment.

The digestive, vascular, and nervous systems may all become more or less disordered, as incidental to gestation, and these derangements will assume various types. The nausea and vomiting, pyalism, depraved appetite, constipation, diarrhœa, etc., are all so many consequences, which, under certain circumstances, may require therapeutic management.

Bloodletting in Pregnancy.—I have already alluded to the dogmatical and dangerous lessons, inculcated by the early fathers regarding the management of the pregnant woman; and these lessons have, I fear, ripened into a maxim which, even at the present day, is too often regarded with scrupulous fidelity. The old-school men taught that pregnancy is a peculiar state, calling for periodical medication; and that the only security for a safe and healthy gestation was the strict observance, on the part of the practitioner, of certain prescribed rules of treatment. In fact, so far from regarding pregnancy a natural condition of the system, they described it as an abnormal state, and hence were predicated upon this basis their views of its management. For example, the doctrine very generally obtained, that one of the universal characteristics of gestation is plethora; and hence the maxim that blood should be abstracted from the arm of the pregnant woman in the fourth, seventh, and end of the ninth month—these being the respective periods in which the gravid uterus is most disturbed by this vascular fulness of the system. You have seen that plethora is not necessarily an accompaniment of pregnancy, and, therefore, any rules of treatment founded upon such an assumption, cannot be sustained according to the laws of rigid analysis; and, moreover, if you were to act in blind obedience to this precept, you could not fail to do a vast deal of harm. It oftentimes happens that many of the phenomena of pregnancy, which are supposed to emanate from plethora, are directly traceable, not to an engorged condition of the vessels, but to an exalted vitality in the uterine organs, and its transmission to the various portions of the economy with which these organs are more or less in close sympathetic alliance.

Then, gentlemen, so far from teaching these crude generalizations of the ancient school, which all bedside experience proves to be erroneous, I shall enjoin upon you the sound principle, that you are to employ the lancet in pregnancy, not because of the fact that pregnancy exists, but because of the incidental occurrence of some

circumstance complicating that condition, which broadly indicates the necessity of loss of blood. For instance, in all acute diseases, in cases of actual plethora, as shown by the bounding pulse, flushed countenance, headache, etc.; in threatened abortion, with marked weight and uneasiness about the hips, accompanied with fulness of the system, blood may be abstracted in quantity, according to the judgment of the practitioner, with good effect.

Cathartics.—It was a favorite maxim of Hippocrates, that cathartics should be administered to the pregnant female only from the fourth to the seventh month, and that, in all cases, the administration of the cathartic should be preceded by the abstraction of blood; and, again, it was maintained by Puzos and others, that purgatives were essentially necessary during the ninth month of gestation, for the reason that they protected the female from many of those post-partum difficulties, which were supposed to be due to a constipated state of the bowels. The only remark I shall make on the subject is, that, unless there should be some special reason, such as the presence of inflammation, the necessity for preceding a cathartic by the use of the lancet is one of the fanciful notions founded upon nothing stable in therapeutics; and as to limiting cathartic medicines to the fourth, seventh, ninth, or any other period of gestation, is about as philosophical as to enjoin upon a navigator, starting from New York to Liverpool, the absolute necessity of steering north, east, southeast, or due east, on stated days. Like the skilful navigator, the physician must be governed by circumstances; and when, in his judgment, cathartics are indicated, they must be given, not according to any stereotyped rule, but for the special object which may present itself at the time.

Emetics.—You will find, in the course of your future experience, that there is a very general prejudice existing, not only among the profession, but also in the public mind, against the employment of emetics during gestation; and this prejudice is founded upon the apprehension that their direct tendency is to produce contraction of the uterus, and, therefore, premature expulsion of its contents. It might appear, *à priori*, that this apprehension is not without force; but it seems to me that, in reality, it is not entitled to much consideration. I have paid some attention to this question, and I am clearly of opinion that the prejudice against the use of emetics in pregnancy is not only unfounded in fact, but has occasionally been productive of bad consequences. I do not know how I can better illustrate the truth of this latter remark, than by the brief narration of an interesting case in point, which came under my observation a few months since:

A married lady, aged twenty-seven years, one year married, was in her seventh month of gestation. Her health had always been good, and particularly so since her marriage. Nothing of any im-

portance occurred during her pregnancy, with the exception of the ordinary phenomena incident to this condition, until the night of Dec. 23d, when, being in her seventh month, she was suddenly attacked, while in bed, with vertigo, followed by loss of consciousness, and stertorous breathing. But a few minutes elapsed before I was by her side. Here, evidently, was a case of apoplexy. What was to be done? In the hurry of the moment, and his mind fixed upon the two prominent symptoms—the loss of consciousness and stertor—the physician would most likely plunge his lancet into the arm for the purpose of relieving the brain of its pressure! He has read in the books, and heard, *ex cathedra*, that, in apoplexy, blood-letting is the heroic remedy. This is a case of apoplexy, and, therefore, he bleeds. Now, gentlemen, this may be a syllogistic argument, and so far as the logic of the schools is concerned, it may have impressed upon it the seal of approbation. But the question is too naked—it is too abstract. In one word, it lacks the necessary collaterals for the medical man in the sick room; and it is precisely this want of completeness which oftentimes paralyses science in its practical ministrations, and exposes both practitioner and patient to the broadest empiricism. It is very true that, in many instances, prompt and full bleeding is the remedy for apoplexy—but not always. We have, for example, apoplexy from gastric repletion—the stomach is filled with indigestible food, thus causing mechanical obstruction to the circulation. In this case, bleeding would be so much time lost, and the last spark of life might become extinct during its performance.

As soon as I approached the bed of my patient, I observed, on a chair, a basin, in which I was informed she had several times attempted to vomit. I noticed in the basin some small pieces of salad, which had evidently been ejected from the stomach. On inquiry, I learned that she had spent the evening at a friend's house, and had partaken very freely of lobster salad and ice cream. Without delay, I mixed twenty grains of ipecacuanha in half a tumbler of warm water, and, with some little difficulty, caused her to swallow it. In a few moments it took effect, and you would have been amazed to see the quantity of undigested food thrown from the stomach. As soon as this offensive material was ejected, the patient evinced marked and gratifying evidences of returning reason—the stertor ceased, and her consciousness was shortly in full play. She went on to her full term; and I had the pleasure, in two months from that time, of presenting her with a fine little boy, alive and in good health. One moment's hesitation, on my part, or the too ready adoption of the routine practice of bleeding, would have sacrificed two lives, and thrown into the deepest grief a devoted husband, whose anxiety on the occasion bordered almost on bewilderment.

To show you that emetics are not incompatible with a healthy

gestation, and do not necessarily provoke premature action of the uterus, I may recall to your recollection a very common practice, among young unmarried women, who, finding themselves pregnant, have recourse to these substances in the hope that they may rid themselves of their burden, and thus, through the destruction of the evidence of their guilt, find shelter against the withering storm of public opinion. But their hope most frequently ends in disappointment—the remedy has not the desired effect. Again: how often are pregnant women exposed to that unearthly sensation, sea-sickness, and yet to miscarry under the most violent and repeated attacks of vomiting, is but an exception to the general rule. Therefore, I have no hesitation in stating, that emetics, during pregnancy, are to be employed, when indicated, with as little reserve as under any other circumstances.

I shall now briefly allude to some of the disorders of pregnancy, which will, occasionally, call for the interposition of science:

1. *Nausea and Vomiting*.—It is conceded that nausea and vomiting are the usual, and, so to speak, the natural sympathetic accompaniments of gestation, and, therefore, under ordinary circumstances, do not require the attention of the physician; but sometimes, it may become necessary to resort to remedies for the purpose of keeping them within reasonable limits. A great variety of agents has been suggested for this purpose. Opium, in its various preparations, may be given internally, a quarter or half a grain at a dose; two or three drops of the solution of morphia, in a teaspoonful of cold water; small pieces of ice internally, or a piece of ice laid on the epigastric region, will sometimes have good effect. Dr. Simpson speaks favorably of the inhalation of laudanum from a small ether inhaler, hot water being used to promote evaporation. I have, occasionally, derived much benefit from the application to the epigastrium of a cloth saturated with laudanum; chloroform, employed in the same way, has been found useful. Equal parts of lemon juice and cold water, say a tablespoonful of each, or the same quantity of lime water and milk, two or three times a day; two or three drops of tincture of nux vomica, every two or three hours, is a remedy much extolled by Lobach; but, he observes, that after the arrest of the vomiting, severe cramps are apt to ensue, which, however, readily yield to the tincture of the acetate of copper, one drop each hour, gradually increasing to six drops an hour. The extract of belladonna, in ointment, applied to the cervix uteri, first suggested, I believe, by Bretonneau and Cazeaux, is sometimes very efficacious. I have employed it with very striking benefit. Its strength should be 3j. of belladonna to ℥i. of adeps; a small portion to be smeared on the cervix once or twice a day, as may be indicated. It should be applied with the finger, and not through the speculum, for the reason that this instrument may, especially

in sensitive women, induce premature action of the uterus. The following, known as the potion of Rivière, has been in much repute, and may be resorted to oftentimes with advantage:

℞. Acid Citric. gr. xxxvj.
 Syrup. Sacchar. f. 3 viij.
 Potassæ Bicarbonat. gr. xxxvj.
 Aquæ Destillat. f. ʒ iv.

The citric acid to be dissolved in one half of the water, and then add the syrup; the bicarbonate of potash to be dissolved in the remaining portion of water, and a tablespoonful of each administered successively. Should the vomiting be aggravated by a constipated condition of the bowels, which is often the case, though it may elude the vigilance of the practitioner, one or two of the following pills may be given as occasion may require:

℞. Pil. Colocynth Comp., } . . . āā gr. xxiv.
 Extract Hyoscyam., }
 Pil. Hydrarg. gr. xij.
 Ft. Massa in pil. xxiv. dividenda.

Dr. Simpson commends highly the nitrate of cerium in one or two grain doses in water. If the patient should eject bile or vicious secretions from her stomach, then a slight emetic will be indicated; nothing better, perhaps, than 10 or 15 grains of ipecacuanha.

You will occasionally, gentlemen, meet with cases of rebellious vomiting, accompanied by a distressing weight in the vicinity of the uterus, with flushed countenance and an excited pulse. In these cases, you will find the abstraction of blood from the arm, from ij. to iv. ounces, repeated as may be necessary, a most efficient remedy. Indeed, if it be not had recourse to, miscarriage will be very apt to follow.*

2. *Ptyalism*.—Salivation cannot be said to be a very common attendant upon pregnancy, yet it does sometimes occur, and will occasionally give rise to annoying consequences from the more or less constant dribbling of saliva, and in quantities so great as to weaken the patient. I have seen but few cases of excessive ptyalism during gestation, and, although there are many remedies recommended, I have not found anything so effectual as occasional small doses of Epsom salts—say, a teaspoonful in half a tumbler of water

* Dr. Clay, of Manchester, calls attention to increased pain and tenderness of the neck of the womb as an occasional cause of persistent vomiting in pregnancy; the increased pain and tenderness being the result of inflammatory action. The slightest irritation of the part induces violent vomiting, and this is arrested as soon as the irritation is removed. He recommends such a position of the patient as shall relieve the cervix from direct pressure by the head; and, if necessary, a resort to leeches, to reduce the inflammation. His treatment was adopted with complete success in three cases. [Midland Quarterly Journal, Oct. 1857.]

every alternate morning; or, if necessary, daily. It produces serous discharges from the bowels, and thus to a certain extent antagonizes the excessive secretion of saliva.

3. *Constipation*.—I think it may safely be affirmed that regularity of the bowels during gestation is the exception, while a tendency to constipation is the general rule; and if this be so, the true reason of this circumstance is certainly worthy of a moment's thought. Not to speak of those examples of constipation, which are to be attributed simply to carelessness on the part of the female, there are numerous others continually occurring during the pregnant state, which need some other explanation. The uterus, it is admitted, under the influence of gestation awakens in the economy various sympathies, and these cannot be evoked without occasionally bringing about more or less derangement in the healthy or natural functions of the particular organs with which they are connected. For example, we have seen that nothing is more common in pregnancy than disturbance of the stomach; so likewise do the heart, lungs, liver, kidneys, and the nervous centres, etc., become more or less deranged in their respective functions. These sympathetic influences are produced through the ganglionic system of nerves, which, becoming to a certain extent the seat of irritation in the uterus, transmit this irritation, through the ganglia and plexuses, to other organs of the system.

I believe that, to a certain degree, the constipation of pregnancy may be explained in the same way—the regular action of the intestinal canal being modified in consequence of a want of healthy nervous power from the ganglionic nerves; this, at all events, in my opinion, is the true explanation of the torpor of the bowels in the earlier months of gestation. But, at a later period, there is an additional cause brought into operation, viz. pressure of the uterus against the intestines; this develops itself more sensibly during the last four months of gestation; for, at this time, the uterus compresses the large intestine just as it passes from the left iliac fossa to the sacrum, and hence there is more or less obstruction at this point to the descent of the *fæces* into the rectum. You may very naturally ask why, when the impregnated uterus becomes largely developed in the abdominal cavity, the whole intestinal canal does not suffer from compression? The simple reason is, that the intestines above the pelvis enjoy great mobility, and are, therefore, from this cause, enabled to accommodate themselves to the distended uterus.

It is very desirable to assist nature, during gestation, in removing the usual torpor of the intestinal canal; for, if it be permitted to continue, headache, fever, and loss of appetite will be apt to ensue. For this purpose, I am in the habit of ordering a simple enema of warm water early in the morning, or what will frequently answer

an excellent purpose, a tumbler of cold water drunk as soon as the patient leaves the bed. Sometimes it may be necessary to give a little manna dissolved in water, and again one or two of the following pills may be administered according to circumstances:

R. Massæ Hydrarg., } āā gr. xij.
 Saponis, }
 Assafœtidæ, gr. vj.
 Ft. Massa in pil. vj. dividenda.

You will sometimes find that, in the attempt to administer an enema, the fluid is immediately returned. This will probably be owing to the circumstance that the rectum is clogged up with lumps of fecal matter, which will be likely to give rise to various local symptoms, such as more or less bearing down in the back passage and tenesmus, which, if continued, may result in premature delivery; pains throughout the pelvis and lower limbs, with indications of paraplegia from undue pressure on the sacral plexus of nerves. Now, this is a very important condition of things, and a little inattention on the part of the accoucheur may result in serious trouble to the patient. Therefore, in all such cases, I would advise you particularly to inquire how long a time has elapsed since the evacuation of the bowels; whether the pain and tenesmus have continued for several days; and if you have reason to believe the rectum to be filled with feces without the ability to expel them, it will be your duty to proceed at once to remove the offending masses. This may be done in one of two ways—either introduce the index finger into the rectum, and thus giving it a hook-like form, bring away, piece after piece, the fecal matter, or, if you prefer it, you may introduce a small spatula, and thus rid the rectum of its contents.

4. *Diarrhœa*.—Pregnant women are occasionally subject to an opposite condition of the bowels, viz., diarrhœa; and it is well to remember that the same causes capable of producing diarrhœa, when pregnancy does not exist, may also display their action during this state, such as improper food, cold, etc.; and again, diarrhœa in pregnancy, as in other conditions of the system, will sometimes be the direct consequence of constipation. Have you never, for example, seen a case of protracted constipation followed by severe diarrhœa? If you have not, such instances will undoubtedly occur to you in practice. In these cases, the intestinal canal becomes irritated by the presence of fecal matter, and more or less profuse diarrhœa will be the result. One word as to the treatment of this latter form of diarrhœa. Give an astringent, and you will most probably destroy your patient. On the contrary, administer a good cathartic medicine, sweep the whole intestinal canal, remove the offending cause—the accumulated fecal matter—and you will not only arrest the diarrhœa, but restore your patient to health. There

is, however, gentlemen, what may be called the *diarrhœa of pregnancy*—that is to say, it will sometimes supervene upon pregnancy almost simultaneously with the inception of this state, produced by a peculiar condition of the ganglionic nerves; so that, although far less frequent than constipation, yet diarrhœa may be regarded an occasional accompaniment of gestation, and may, by debilitating the system, give rise to unpleasant results; *but what is most to be apprehended is its tendency in women of great nervous susceptibility to produce miscarriage.* The diarrhœa must be treated on general principles; should it result from improper food or constipation, a purgative will be indicated; if the food be still in the stomach, administer ten or fifteen grains of ipecacuanha; if from nervous irritability, calming enemata, etc. A tablespoonful of the following mixture may be given with good effect two or three times a day:

℞. Cretæ Misturæ, f ̄ 3 vj.	
Tinct. Opii,	}
“ Catechu,	
“ Kino,	
	āā f ̄ 3 j.
	M.

5. *Palpitation of the Heart.*—In women of great nervous susceptibility, palpitation of the heart is not an unusual attendant upon pregnancy during the earlier months. It sometimes resolves itself into quite a disturbing symptom, and will need attention. If not controlled it may lead to miscarriage. When it is found to be due simply to nervous irritability, gentle tonics and antispasmodics judiciously employed will be followed by good results. Small doses of quinine with nourishing and digestible food; and, as an antispasmodic, thirty or forty drops of the tincture of hyoscyamus will prove valuable. If the palpitation, as will sometimes be the case, should be occasioned by a plethoric condition of system, the broad indication is the lancet, together with the use of saline cathartics and moderate diet. The quantity of blood to be abstracted must rest with the judgment of the practitioner. In the latter months of gestation the female will oftentimes complain of distressing palpitation, which arises neither from nervous irritability nor plethora, but from the mechanical pressure of the elevated diaphragm, thus encroaching upon the capacity of the chest, and, therefore, giving rise to functional disturbance of the heart. The most certain remedy in this case will be patience, for the difficulty will terminate with the delivery. But something may be gained by position; the patient usually experiences more or less relief in the sitting or demi-recumbent posture. It is highly important that the bowels be kept in a soluble state, for constipation will tend to aggravate this particular form of palpitation.

Larcher* has endeavored to show that, during pregnancy, there is a normal hypertrophy of the heart, which consists in a thickening of the left ventricle, the walls of which are increased in volume from one-fourth to one-third over their ordinary dimensions; this increase is confined exclusively to the left ventricle, no other portions of the organ participating in it. The statement of Larcher is deduced from several hundred post-mortem examinations. The interesting practical fact connected with this opinion is, that the hypertrophy of the left ventricle will explain the bellows sound so frequently detected in gestation, and which, therefore, is not to be regarded, in this case, as necessarily connected with fatal organic lesion of the organ.

6. *Syncope*.—Young married women, in their first pregnancy, are very apt to be attacked with syncope. Indeed, according to my experience, this is much more frequent than is generally admitted by writers. I have known it to occur as early as the second week of gestation. It is usually confined to the earlier months, but in some cases it exhibits itself at the time of quickening. It will develop itself in women of good health, as well as in those of delicate constitution. Sometimes, its duration is quite brief and evanescent, while again it will continue for a longer period, producing much disquietude on the part of friends. It may take place at any time, and without the slightest premonition. Syncope cannot, I think, as a general rule, be regarded a dangerous complication for the mother. I have never seen fatal consequences ensue from it, except in one case, where it was well ascertained that organic disease of the heart had previously existed.† It is, however, not without danger, under certain circumstances, to the child; for example, when the syncope is long continued, the interruption of the proper supply of healthy blood to the fœtus may result in its destruction. Allow me, here, to call your attention to an important distinction between syncope, strictly speaking, and a sudden loss of consciousness, unaccompanied by suspension or diminution in the heart's action; this latter seems to have an analogy with epilepsy; and, of course, its treatment must depend, as far as may be ascertained, upon the particular cause producing it.

In an ordinary case of fainting, the treatment is simple; the patient should be placed instantly in the recumbent position, *her head on a plane with her body*, in order to facilitate the passage of blood to the brain; the dress loosened, fresh air admitted, cold water dashed in the face, and, if necessary, salts of ammonia applied to the nose. It should also be recollected that simple mechanical excitement of the heart by manual pressure is a valu-

* Gazette Médicale de Paris. 1857. p. 258.

† It is proper to mention that there are some few cases recorded of sudden death from syncope during pregnancy, the syncope being the result simply of emotion.

able means of re-establishing its rhythmical movement. It can scarcely be necessary to remark that a proper supervision should be exercised by friends in cases in which the female becomes subject to these fainting turns.

7. *Pain in the Abdominal Parietes.*—In women with their first children, more especially, there will occasionally be experienced excessive pain in the abdominal walls from the sixth to the ninth month of gestation. The true cause is, no doubt, the great distension to which these parts are subject, and the firmer resistance which they offer in a primipara. Sometimes, the pain amounts to intense suffering, and the practitioner must be careful not to confound it with inflammation. The diagnosis is very clear—in mere pain of the abdominal muscles from distension, there is no fever; pressure and frictions relieve, instead of aggravating, the distress. In inflammation, on the contrary, the slightest pressure increases the pain, and there is high fever, with an accelerated and hard pulse. I have found in these cases of severe abdominal pain much benefit from the application, by means of gentle friction, of equal parts of laudanum and sweet oil; soap liniment, or camphorated oil is also useful. For the purpose of relaxing and soothing the stretched integuments a large slippery-elm poultice, applied warm, will be very servicable.

8. *Relaxation of the Abdominal Parietes.*—You will, in women who have borne several children, oftentimes observe an opposite condition of the abdominal parietes. Instead of being excessively tense from distension, they will present an aspect of relaxation, being absolutely as it were, flabby, and utterly unable to afford the necessary support to the developing uterus. This necessarily exposes the gravid organ to the displacement known as anteversion, which, if not remedied, will, during the pregnancy, occasion much disturbance about the bladder, and at the time of labor present serious obstruction to the delivery of the child, as will be more particularly mentioned when speaking of the causes of obstructed delivery. The remedy for this relaxed condition of the abdominal walls is proper support; it can be afforded by the employment of a broad elastic belt which, if properly adjusted to the person, will prove quite sufficient in preventing the displacement to which I have referred. Before applying it, the accoucheur, if the uterus be already anteverted, should gently grasp the fundus of the organ, through the abdominal coverings, and direct it upward and backward with a view of restoring it to its normal position.

9. *Painful Mammæ.*—The breasts, particularly in the primipara, sometimes become the seat of distressing pain. As pregnancy advances, they enlarge, the lacteal glands and ducts undergoing more or less constant development—the consequence is, occasionally, great local distress, producing at times fever, and other consti-

tutional disturbance. In these cases, you will find, especially if the bowels be confined, much benefit from the derivative action of Epsom salts given in small quantities in solution, and as circumstances may indicate. Benefit will also be derived from local applications; gentle frictions with some liniment, camphorated oil, laudanum and sweet oil, or a poultice of crumbs of bread, saturated with a small quantity of tincture of belladonna. If the patient be plethoric, the abstraction of a few ounces of blood will be of advantage; and I have known great good accrue from tolerant doses of tartarized antimony.

10. *Pain in the Right Side.*—About the sixth month of pregnancy, women are often attacked with pain in the right side, which may possibly, through inadvertence, be mistaken for inflammation. The pain usually arises from the fact that the ascending uterus begins to exercise a pressure on the liver. As a general rule, the pain will continue more or less until after delivery, although it may be mitigated by the occasional use of a mercurial pill at night, followed in the morning by oil, or Epsom salts.

11. *Pruritus of the Vulva.*—A most distressing itching of the external organs will sometimes manifest itself during pregnancy, and, in its aggravated form, it will constitute one of the most painful affections with which the pregnant female has to contend, causing her literally to lacerate the parts by the constant scratching to which she has recourse in the hope of temporary relief. Ulcerations often result, requiring very nice attention on the part of the practitioner. You will meet with pruritus of the vulva in other cases than pregnancy, but when it is found to complicate gestation, it calls for more than usual vigilance, for, if not controlled, it may lead to abortion. The female, from motives of delicacy, oftentimes conceals the fact of her suffering, and, on this account, the physician is generally not consulted until the malady has reached one of its most aggravated phases. The characteristic feature of the disease is intense itching; sometimes small vesicles, containing a sero-sanguineous fluid, will be observed on the inner surface of the parts, where, in some cases, deep ulceration will be provoked.

I have just stated that other causes than pregnancy will produce pruritus of the vulva; such, for example, as the final cessation of the menses, inattention to personal cleanliness, the presence of what are termed the pediculi pubis, known as the small parasite insects, which occasionally infest these parts, discharges from the vagina, ascarides in the rectum, etc. In some instances the worms will pass from the rectum to the vagina, and two cases have recently been published by Dr. Vollez, in which pruritus pudendi resulted from the presence of ascarides exclusively in the vagina, none having been found in the rectum. In these instances, mercurial ointment will prove an efficient remedy.

Treatment.—The treatment of pruritus must depend upon the particular condition of the parts, and also upon the cause to which it is traceable. When there are no ulcerations, I have generally found, if there be nothing to contra-indicate it, the abstraction from § iv. to § vi. of blood from the arm, together with saline cathartics, and a lotion applied freely of § i. of the borate of soda to Oj. of water, with 3 i. of Magendie's solution of morphia, to be followed by good results. When the parts are ulcerated, I always touch the ulcerated surface with the solid nitrate of silver, and this should be repeated every fourth or fifth day, as may be indicated by the progress of the disease. The parts to be cleansed with Castile soap and water, and, as far as possible, rest enjoined on the patient. This malady is apt, especially when suffered to continue for some time, to result in emaciation, and in such case, if you limit your remedies to local applications, you will fail in affording relief. Tonics, together with nutritious diet, will be indicated.

There will occasionally be developed a form of pruritus of the genital organs, assuming the character of eczema, which is extremely difficult to manage, often proving obstinately rebellious to remedies. In this particular condition of things, the following treatment has been proposed by M. Tournie, and which I have found very efficient for the purpose. He recommends, as topical applications, calomel ointment, and a powder of camphor and starch. Should the parts be covered with scabs, emollient poultices are first to be employed; when the scabs are removed, the ointment is to be applied twice a day, 3 j. of calomel to § j. of lard; after each application, a powder, consisting of four parts of starch to one of finely powdered camphor, to be freely used.

12. *Hemorrhoids.*—Hemorrhoidal tumors, or piles, are not uncommon during pregnancy, and frequently give rise to much distress. When large, they may, by the excessive pain they induce, occasion premature action of the uterus. In the pregnant woman, there are two causes in operation which tend directly to the formation of these tumors: in the first place, pressure exerted by the gravid uterus on the venous trunks, thus obstructing the free return of blood to the heart, and secondly constipation, which is so frequent an attendant upon gestation. These hemorrhoidal tumors may be either external or internal; in either circumstance, they are exceedingly apt to be accompanied by much pain and irritation. If they bleed, which is sometimes the case, the patient, for the time being, is relieved, for their disgorgement is always followed by a diminution in their volume, and consequently a lessening of the irritation and pressure. Occasionally, however, the bleeding will be so frequent as seriously to affect the health, resulting in an anæmic condition of the system, and imposing upon the female the various nervous and other derangements consequent upon this bloodless

state. In such case, too prompt attention cannot be directed toward the arrest of the hemorrhage.

One of the first indications to engage the attention of the practitioner in hemorrhoids is to overcome the constipation, and keep, if possible, the bowels soluble, for, as long as the torpor continues there will be but little hope of benefit from local applications; the recumbent posture will also be of service in measurably removing the amount of pressure exercised by the uterus. If the tumors be large, and from their tension occasion much suffering, one of the most effectual remedies will be the application of from two to four leeches, depending upon the judgment of the practitioner. An efficient remedy, also, will be an injection, night and morning, into the rectum, of half a pint of cold water, and the introduction, for two or three hours each day, of the metallic rectum bougie. I regard these latter means of very great value in the treatment of hemorrhoids, especially when they are internal.

When it agrees with the stomach, sulphur will be found an excellent medicine to administer internally—a teaspoonful may be mixed with honey or molasses, and given once or twice a day. It is gentle in its operation, and will, in many cases, exercise a happy influence in diminishing the volume of the hemorrhoids. Let me here enjoin upon you a most important direction, the neglect of which oftentimes, I am sure, leads to much unnecessary suffering on the part of the patient; the direction to which I allude is this: always, after each evacuation of the bowels, instruct the female to introduce the protruding piles within the rectum; this can usually be accomplished without difficulty, except in cases in which the tumors have attained a large size. You perceive at once the advantage of the practice. If the tumors remain external to the anus, the consequence is they become subject to the full pressure of the external sphincter muscle, and it is this very pressure which so often aggravates the intensity of the suffering. Much vesical irritation will sometimes ensue from the presence of the piles, and, unless your attention be specially directed to the circumstance, you will fail in giving relief to the bladder, for the reason that, in lieu of regarding the irritation as simply symptomatic, you will most likely mistake it for, and treat it as, an idiopathic or primary affection. The remedy, of course, is the relief of the piles.

13. *Varicose Veins*.—Women, during the period of their gestation, are subject to enlargement, or a varicose condition of the veins of the lower extremities. It is the result of the mechanical pressure exerted by the uterus. This enlargement of the venous trunks is, however, not always confined to the lower limbs. It will sometimes be observed in the lower portion of the abdomen, vulva, and vagina. These varicose veins are most likely to develop themselves during the latter four months of pregnancy, when the pres-

sure is greatest; but they will also be observed during the earlier months, particularly in cases in which, as will sometimes happen, there is a predisposition to their formation. The great remedy is a uniform and well-directed pressure, in order that due support may be given to the distended trunks. A properly-adjusted lace-stock-ing will be found well adapted for this purpose, or an ordinary roller bandage, commencing at the toes and continuing up to the knee. In cases of fulness of habit, the occasional abstraction of blood, and saline cathartics will be indicated. It is always advisable in these cases to allow the patient, as much as possible, to avail herself of the advantage of position—hence benefit will be derived from the recumbent posture and, even when sitting, she should be directed to place her limbs on a chair, so that they may be on a level, or nearly so, with the plane of the body.

14. *Cough and Oppressed Breathing.*—Some women, and this is more especially the case in nervous, irritable constitutions, are very apt to be troubled with a cough in early pregnancy. This cough is peculiar, and is well worthy the attention of the practitioner; it may, in strict truth, be denominated a nervous cough; it is usually dry, unaccompanied by expectoration, except in some instances there will be a slight sero-mucous discharge; it is paroxysmal, without fever, and, on an exploration of the chest, there will be an entire absence of all the physical signs, indicating organic lesion of the pulmonary apparatus. Now, what is this cough, and how is its presence to be explained? It is, unquestionably, one of those examples of sympathy evoked in distant organs, by irritation of the uterus, to which your attention has been so repeatedly directed. This character of cough will sometimes continue rebellious to all medication during the whole period of gestation—at other times, it will spontaneously become arrested at the third or fourth month. In cases in which the irritation of the uterus is very marked—as will be evinced by local pain, bearing down, and general uneasiness about the hips, I have found either the injection of laudanum into the rectum, thirty drops to a wine-glass of tepid water, or the application of belladonna ointment to the cervix uteri, in the proportion of ℥j. of the extract to ℥j. of lard, very efficient in relieving the cough. The internal administration of the tincture of hyoscyamus, thirty or forty drops in half a wine-glass of cold water, as occasion may require, is also a good remedy.

But, gentlemen, during the latter period of pregnancy, especially in the two last months, there will frequently be a cough of a different kind—it arises from the mechanical pressure of the uterus against the diaphragm, thus encroaching upon the capacity of the chest, and resulting in irritation of the lungs, which, of course, occasions more or less cough. Accompanying it, there will, also, be a feeling of oppressed respiration. Patience here is the most

certain remedy, for these symptoms will cease as soon as delivery is accomplished, and frequently in the last two weeks previous to labor, because of the descent of the gravid uterus into the pelvic excavation, thus removing the mechanical disturbance from the diaphragm. However, both the cough and dyspnœa may be palliated by keeping the bowels in a soluble state, and if the patient should be disposed to plethora, occasional abstraction of blood will be serviceable.

LECTURE XVI.

Complications of Pregnancy from Displacements of the Uterus—Prolapsion, Ante-version and Retro-version of the Organ—Three Varieties of Prolapsion—Evils and Treatment of these Varieties—How Direction of the Urethra is Modified—Rules for Introduction of Catheter—Ante-version, Symptoms and Treatment of—Retro-version more frequent than Ante-version—Complete Retro-version occurs only during earlier Months of Gestation—Occasional Serious Consequences of this Form of Displacement—Premature Labor sometimes the Result of Retro-version—Diagnosis of Retro-version—How determined—Symptoms—Retention of Urine—Puncture of Bladder, first proposed by Sabatier—Treatment of Retro-version—Plan of Evrat, Halpin, and Gariel—Retro-version often mistaken for other Pathological Conditions—Prolapsion of Ovary in Triangular Fossa, and Faeces in the Rectum—How distinguished from Retro-version—Hernia of Gravid Uterus.

GENTLEMEN—In the previous lecture, mention has been made of some of the ordinary disorders of pregnancy, arising more or less from sympathetic and mechanical influences, exercised by the gravid uterus on various organs of the economy. We shall now direct your attention to the consideration of other complications of gestation, the result of displacement of the uterus itself. You are well aware that this organ, from its peculiar situation and relations, enjoys a remarkable degree of mobility, and is, therefore, liable, especially in its unimpregnated state, to various displacements; examples of these you have had repeated opportunity of observing in the Clinic.

The uterus is, also, subject to malpositions during the period of pregnancy, and these, although much less frequent than when gestation does not exist, are yet attended by more serious consequences. There are three forms of displacement to which the gravid womb is exposed, and it is proper that you should understand their particular bearing upon gestation: 1. *Prolapsus*; 2. *Ante-version*; 3. *Retro-version*.

1. *Prolapsus Uteri*.—There are three degrees of prolapsus in pregnancy, as there are in the unimpregnated condition; in the first, the uterus has fallen slightly below its normal position; in the second, it has passed to a level with the vulva; and, in the third, it is completely out of the vulva, constituting a veritable procidentia. The causes of either of these varieties are numerous—such as relaxation of the vagina, or ligaments of the uterus, the presence of tumors in the abdomen, habitual constipation, falls, or blows. When speaking of the changes produced in the uterus in early pregnancy,

you will remember we noted very particularly the important circumstance that, for the first two months, the tendency of the organ is to descend into the pelvic excavation; and this very descent, which is one of the ordinary phenomena of early gestation, may act as a predisposing cause to either of the varieties we have named. As a general rule, the uterus, in the first two varieties, usually, about the fourth month, undergoes spontaneous restoration, by the gradual ascent of the organ into the abdominal cavity. Sometimes, however, this is not the case; and when the uterus presses on the vulva, serious inconveniences will result. For instance, the rectum becomes irritated, giving rise to constipation, and an annoying tenesmus; the bladder, also, is affected. Sometimes, there will be, more or less, a constant desire to pass water; at other times, there is complete retention of urine, requiring the introduction of the catheter.

In these cases, it is of great importance to attempt the replacement of the uterus, for the obvious purpose of removing the pressure from both the rectum and bladder. With this view, the practitioner should gently grasp with his fingers, previously lubricated with oil or lard, the cervix of the organ, and make uniform pressure, at first a little backward, and then upward, in a direction parallel to the axis of the superior strait. The patient should be kept in the recumbent posture, and a sponge-pessary introduced, which may be retained *in situ* by means of the T bandage. It should not be forgotten to have the sponge removed at least once a day for the purpose of cleansing it. After the fourth month, its use may generally be dispensed with, for the uterus, having ascended above the superior strait, will usually remain in the abdominal cavity, without the necessity of support. The tenesmus may be partially relieved by the use of injections of warm soap suds into the rectum, and, in order to facilitate the admission of the fluid, the practitioner will sometimes find advantage in the introduction of the index finger into the intestine for the purpose of gently pressing the uterus forward, so that the pipe of the syringe may meet with no obstruction.

Introduction of the Catheter.—For the relief of the bladder, suffering from retention, resort must be had to the catheter. You will readily understand that, in the second variety of uterine displacement—the cervix of the uterus pressing upon the vulva—the natural position of both the bladder and urethra will be modified—the bladder, of course, is prolapsed, sometimes protruding slightly beyond the vulva, and the urethra, instead of being oblique from below upward, will be so changed in its direction, that, from the meatus to a little beyond its central portion, it will be horizontal, while its vesical extremity will be drawn downward. You perceive, therefore, that without a recollection of this circumstance,

the successful introduction of the catheter would not be an easy thing to accomplish, to say nothing of the serious consequences which would most likely ensue from a forced attempt to overcome the difficulty. The catheter, under these circumstances, should be introduced at first horizontally, from before backward, and then the outer extremity of the instrument elevated, while the internal extremity is correspondingly depressed, for the purpose of following the altered direction of the urethra, and thus entering the cavity of the bladder, which you must remember is *downward and forward*, and not *upward*, as it is in its normal position; it must also be remembered that, in this case, the convex border of the instrument should be turned *upward*, and its concavity *downward*.

When the gravid uterus is in a state of complete procidentia, the complications become much more aggravated. The difficulties about the rectum and bladder are necessarily much increased, and the patient is exposed to additional suffering. There are well-authenticated instances of women having passed the period of gestation with the uterus protruding beyond the vulva. You can readily imagine the distress and danger consequent upon such a condition of things. When procidentia of the gravid uterus exists, the first duty of the practitioner is to attempt its reduction, by grasping it gently with the fingers, and making pressure from before backward, parallel to the axis of the inferior, and then upward in the direction of the axis of the superior strait. When reduced, it should be retained in place by means of the sponge-pessary and T bandage.

It may, in cases of procidentia of the impregnated womb, become a question how far it is justifiable to promote premature delivery; and this question will necessarily present itself in instances, in which the local irritation or constitutional disturbance is such as to involve, in more or less hazard, the safety of the patient. The ultimate decision must depend upon the accompanying circumstances of each individual case, and the sound judgment of the practitioner.

II. *Ante-version*.*—Ante-version of the uterus is comparatively of rare occurrence in early pregnancy; although you occasionally meet with it in women who have borne many children, and whose abdominal walls are consequently so much relaxed as to be inadequate to afford the proper support to the ascending organ, and it, therefore, falls forward, giving rise to two conditions: 1st, *Ante-version*; 2d, An increased prominence to the abdomen. If ante-

* There is a broad difference between ante-version and ante-flexion of the uterus. In the latter, the uterus is, as it were, curved on itself in such way that the two upper thirds of the organ are thrown forward on the bladder, but the cervix is undisturbed in its relations with the pelvic cavity. So, also, in retro-flexion, while the superior portions of the uterus are curved backward the position of the cervix remains unchanged.

version occur in early gestation, before the uterus has left the pelvic excavation, it can readily be replaced by passing the finger into the vagina, and pressing the anterior surface of the organ backward; sometimes, it may be reduced to its normal position by gently drawing the cervix forward, the tendency of which will be to place the body and fundus in a position parallel to the axis of the superior strait of the pelvis. In a more advanced period of gestation, when the uterus is ante-verted, because of relaxation of the abdominal parietes, the practitioner should, in the first place, restore the organ to its normal position by righting it with the palm of his hand applied to the abdomen, making the pressure from below upward, and from before backward; and secondly, an abdominal brace, or bandage, is to be applied for the purpose of retaining the uterus *in situ*.

III. *Retro-version*.—Retro-version is much more frequent than ante-version, and may occur in the virgin, in the married woman, who is not pregnant, and it may also complicate pregnancy itself. It is most common when the uterus is in a state of vacuity. It is quite obvious that this form of displacement must take place during the earlier months of gestation, for, after the fourth and fifth months, the longitudinal diameter of the uterus is so much in excess of the antero-posterior diameter of the superior strait, that it is physically impossible for the organ to become completely retro-verted.

Retro-version of the uterus implies a displacement of the organ, by which it rests more or less horizontally in the pelvic excavation, the fundus being directed toward the sacrum, and the cervix regards the internal surface of the pubes. This displacement, when complete, divides, as it were, the cavity of the pelvis into two compartments, an upper and lower—for the former, it constitutes the floor, and for the latter, the roof or superior boundary. The term retro-version was, I think it is generally conceded, first applied to this character of mal-position by Dr. Wm. Hunter.

There are numerous causes capable of producing retro-version; among which may be enumerated an enlarged pelvis, a relaxed condition of the ligaments of the organ—the round and broad; undue pressure whether against the anterior surface of the uterus, or upon its fundus; the efforts of vomiting, straining in the attempt at defecation, a distended bladder, and any sudden or violent movement may also produce it. Retro-version will, sometimes, be congenital; it is almost always, however, the result of accident.

It is sometimes very gradual in its occurrence, and again it is quite sudden. In the latter case, it is the consequence of some extraneous physical violence experienced by the female, such as a fall, blow, or the lifting of a heavy weight. When this displacement has taken place, it is accompanied by symptoms, which, to the

vigilant practitioner, will generally indicate its nature—for example, there will be more or less uneasiness experienced about the loins, and oftentimes a dragging sensation, irritation of the bladder and rectum, with difficulty in evacuating either; sometimes, it will be almost impossible to evacuate the rectum in consequence of the extreme pressure exercised upon it by the retro-verted organ.

All these results are very much increased in the gravid uterus, and occasionally fatal consequences ensue from its complete horizontal impaction between the sacrum and pubes, giving rise, in the first place, to severe pressure, resulting subsequently in inflammation, ulceration, and its consequences. In this case, also, there may be rupture of the bladder from the continued retention of urine, and the impossibility of drawing it off by means of the catheter.* The rectum, loaded with fecal matter, will occasion a tenesmus which, provoking on the part of the female excessive efforts to expel the contents, may result in rupture of the vagina, thus causing the fundus of the womb to pass through the opening. A case of this kind, which proved fatal, is mentioned by Dubois, as having been communicated to him by Dr. Mayor. There are examples of this displacement, in which death occurred from the severe local inflammation, and consequent constitutional disturbance, resulting from pressure of the retro-verted womb. It will sometimes happen that the uterus, from the serious irritation to which it is exposed, will be thrown into premature action, thus ridding itself of its contents. This, in cases in which it becomes impossible to reduce the malposed organ, should be regarded as a most fortunate issue, for it will prove the means of saving the life of the mother, and enable the practitioner to restore the uterus to its normal position. Indeed, when this early evacuation of the uterus is not accomplished by nature, it is, under certain circumstances, the only resort left for the accoucheur.

The *diagnosis* of a retro-verted womb is, ordinarily, not difficult. In addition to the local disturbance, to which allusion has already been made, a vaginal examination will soon dissipate all doubt. The finger will readily recognise a change in the position of the

* A woman, aged thirty-five years, had enormous distension of the abdomen, which, on examination, had all the characters of ascites; there was dulness over the greater part of the cavity, extending high up above the umbilicus, and evidently due to the presence of fluid. A medical practitioner had been on the point of performing paracentesis so urgent was her distress. Fortunately, this was deferred, and she was taken to the Westminster Hospital. On inquiring into her history, it was learned that she was three months pregnant. A catheter could not be introduced, and on examination, a retro-version of the womb was detected, which had probably existed three weeks, the duration of the swelling. A few ounces of urine dribbled away daily. The fundus of the womb was pushed up, and immediate relief given, upwards of a gallon of urine flowing away without the aid of the catheter. The woman recovered. [Lond. Lancet, April 30, 1859.]

organ, the cervix being in front, and the fundus behind, pressing, more or less, upon the rectum; and, in complete retro-version, the posterior surface of the organ will form the upper boundary of the pelvic excavation, being distinctly felt by the finger, extending horizontally from before backward.

When pregnancy does not exist, retro-version of the uterus cannot be said to be a dangerous complication, although it is one of much annoyance to the patient, and oftentimes, from the difficulty of retaining the organ *in situ*, of embarrassment to the accoucheur. Very different, however, is the case during the period of gestation, for here, as you have just seen, the most formidable and, occasionally, fatal results ensue.

Two of the earliest, most constant, and distressing symptoms of this displacement will be irritation of the bladder and rectum; and this very irritation is frequently the first indication that there is anything wrong.

Having told you in what retro-version consists, and spoken of the consequences of this form of displacement, the next point for consideration is, as to the remedies to be employed. One of the most imperious demands will be the evacuation of the bladder and rectum, more especially the former. But this is not always readily accomplished, for the reason that the distended bladder ascends obliquely upward into the abdominal cavity, and so changes the position of the urethra as sometimes to render it physically impossible to introduce the catheter.

This constitutes one of the most serious and painful complications of retro-version; and, under such circumstances, as death will be inevitable without relief to the bladder, the very important question arises: What is to be done? We have the authority of Sabatier, in these cases, to perforate the bladder above the pubes; and, if the necessity of the operation be indicated, I should not hesitate to have recourse to it; for the double reason that relief must be had, and, secondly, the operation itself does not necessarily involve any danger. The rectum should be evacuated by means of enemata, or, if required, the feces may be scooped out with a small spoon or spatula.

These two viscera being emptied of their contents, an effort should next be made to restore the uterus to its proper position; for this purpose, various plans have been suggested. In the event of inflammation having arisen from the severe pressure of the uterus against the adjacent organs, any attempt at reduction should be preceded by means best calculated to remove inflammatory action, such as leeches, hot fomentations, and emollient injections into the vagina. Minute doses of tartarized antimony, given to tolerance, will frequently be followed by good effects in subduing the local excitement. This being accomplished, efforts may be

made to reduce the organ to its usual axis. For this purpose, the index finger of one hand should be introduced into the rectum, with the view of pressing the fundus of the womb upward and forward; at the same time, the finger of the other hand is to be carried through the vagina to the cervix of the organ, and a movement made precisely counter to the other—that is, the cervix should be brought a little downward and backward. This simple manipulation, adroitly performed, will sometimes result in the restoration of the retro-verted uterus, but not always. Much will sometimes be gained by the position of the patient; for example, if either on the back, or resting on her left side, you should fail in accomplishing the object, it will be found useful to direct your patient to place herself on her knees and elbows—this will tend to facilitate the attempt at reduction; but the position is an unpleasant one, and oftentimes there will be objection made to it.

Évrat suggested the introduction into the rectum of a tampon prepared in the following manner: a small rod about twelve inches in length has fastened to one extremity a sort of mop made of fine old linen, and well smeared with oil or fresh lard; this tampon is then gently introduced into the rectum; of course, it is soon brought in contact with the lower surface of the malposed organ, and with a uniform but judicious upward and forward pressure, Évrat and others have succeeded in giving to the uterus its natural position. It is, however, to be recollected that, while pressure is made upward and forward by means of the tampon, the finger of the accoucheur should be introduced into the vagina for the purpose of making downward and backward traction on the cervix.

If it prove impossible to reduce the organ, then it has been proposed to perforate the uterus through its posterior wall with a view of affording escape to the liquor amnii, and with the hope of so far diminishing the bulk of the gravid uterus as to facilitate the reduction. This, however, is a dangerous expedient, and should not be resorted to except in those cases in which it is absolutely impossible to rupture the membranes through the cervix, which, although difficult in this form of mal-position, may, with due care and perseverance, be accomplished.

It has been suggested by Halpin,* in cases which have resisted the ordinary attempts at reduction, to pass into the vagina an instrument, the object of which shall be the exercise of a uniform pressure simultaneously on the entire lower surface of the uterus. Thus he contends, by means of a bladder, he can completely fill the pelvis, and elevate into the abdominal cavity the different viscera contained within the excavation. For this purpose, he places an empty bladder between the fundus of the womb and rectum; he

* Arch. Gen. 1340, p. 88.

then cautiously inflates it, and, as the bladder becomes distended, the retroverted uterus is replaced. A plan very similar to this has been suggested by Gariel. He introduces one of his vulcanized india-rubber pessaries into the rectum; it consists of a dilatable air pessary, with an air reservoir, and a tube, to each of which are attached small taps. The collapsed pessary, having been previously placed in warm water, is introduced by means of a probe into the rectum, immediately behind the uterus; then the tube of the pessary is adjusted to the air reservoir; the taps are opened, and by simple pressure of the hand the air is made to escape from the reservoir into the pessary; in this way the pessary presses upon, and raises the retro-verted uterus from the hollow of the sacrum; thus the natural position of the organ becomes restored. This is an ingenious contrivance, but the proper application of the instrument requires much care in order that it may prove efficient.

It is not at all uncommon for the inattentive practitioner to suppose that retro-version exists, when, in fact, there is no displacement whatever; and, I think, I shall perform an acceptable service by directing your attention briefly to the causes of error. I have more than once been consulted by medical gentlemen, who have treated their patients for this supposed mal-position, when, upon examination, I have discovered that the symptoms, which had been mistaken for those of retro-version, were due to circumstances with which dislocation of this viscus had no sort of connexion. Two of the most prominent causes of error will be:

1st. A collection of fecal matter in the rectum; 2d. A prolapsion of the ovary into the recto-uterine fossa. You will perceive that either of these contingencies will necessarily, to a greater or less extent, give rise to the same local disturbances, which usually characterize a retro-version of the uterus—such, for example, as pain about the hips, distressing pressure on the rectum, with frequent desire to defecate, together with tenesmus. How, then, is the diagnosis to be determined—and in what way is the true nature of the difficulty to be ascertained? If it be a collection of fecal matter in the rectum, this can readily be appreciated, almost in all instances, by a vaginal examination. Let the accoucheur, as he passes it into the vagina, run his finger carefully along the track of the rectum, with a view of ascertaining, whether or not it is unusually distended—if the distension be due to fecal matter, he will be enabled to recognise the fact by slightly pressing upon the rectum, which will enable him to separate the different pieces of hardened feces, and thus become satisfied that it is their presence, which has caused the symptoms to which we have just alluded. Again, in retro-version, while the fundus is thrown backward into the hollow of the sacrum, the cervix of the uterus inclines toward the pubes; this will not be the case when the rectum is simply loaded with

excrement. But, in order to remove all doubt on the subject of the diagnosis, let the rectum be freely evacuated by enemata; if this cannot be accomplished by these means—as is sometimes the case—then the finger, or a small spatula, should be introduced, and the feces brought away, as has been previously suggested. The rectum being relieved of its distension, it will follow, as a necessary result, if there be no retro-version, that the patient will, at once, experience an absence of the distressing local disturbances.

How are we to proceed in our diagnosis of prolapsed ovary? In this case, if the ovary have not undergone enlargement from disease, it will not be difficult to displace it from side to side by means of the finger, indeed, in some instances it may be pushed upward without difficulty, but as soon as the finger is withdrawn, it again prolapses; the most positive demonstration that it is a prolapsed ovary, will be the introduction of the uterine sound.

Let the accoucheur carry the sound into the uterus, which must always be done with great caution; as soon as it is sufficiently introduced, the uterus, should it be retro-verted, will, of course, while the sound is within its cavity, become righted in its position; if, under these circumstances, the finger of the accoucheur be introduced into the vagina, he will not feel anything pressing upon the rectum—but, on the contrary, if, after the introduction of the sound, the tumor be felt, then it is evident that it is occasioned by the presence of the ovary in the recto-uterine fossa.

Hernia of the Gravid Uterus.—Hernia of the impregnated organ is extremely rare; still there are some recorded examples of it. Dr. Evory Kennedy, in his work on obstetric auscultation, cites the instance of an umbilical hernia of the uterus in a female, who had previously borne several children. It appears that while in labor with her second child, she was attacked with an ordinary umbilical hernia; this continued gradually to increase, when, in a subsequent pregnancy, the gravid organ passed completely out of the abdominal cavity through the umbilical opening, so that, at the end of the ninth month, it extended to the knees. Madame Boivin has recorded a case of ventral hernia of the impregnated womb, the organ passing out through an opening above the pubes, which opening was the result of a large abscess. Other varieties of hernia have also been mentioned as having occurred, such as inguinal and crural.*

* I find, in the Obstetrical Transactions of London, for 1856, p. 77, the following interesting case of umbilical protrusion of the impregnated organ, having occurred in the practice of Mr. G. C. P. Murray: Mrs. M. A. J., thirty years old, mother of three children, observed some blood issuing from her navel; on examining the abdomen, Mr. Murray observed a large tumor the size of a gravid uterus in the latter months; the head of a fetus could be distinctly felt, at the right and upper portion of the umbilical tumor, the body of the fetus extending downward on the left side. There

LECTURE XVII.

The Annexæ of the Fœtus; The Decidua—Hunter's Theory of its Formation; The Decidua, an Hypertrophied Condition of the Uterine Mucous Membrane—The Reflexa; how formed—Coste's Views—Uses of the Decidua—The Chorion and its Villi—The Uses of each—Nourishment of the Embryo through the Villi—Professor Goodsir—The Amnion; its Uses—The Liquor Amnii: Origin of—Is it derived from Mother or Fœtus?—Casts of the Uriniferous Tubes found in Liquor Amnii—Uses of Liquor Amnii—Various—Does it contribute to Nourishment of Fœtus?—The Placenta—Peculiar to the Mammiferous Class—How Divided, and Dimensions of—Two Circulations in Placenta—Distinct and Independent—Red Corpuscles—Difference in Size of in Fœtal and Maternal Blood—When does Placenta begin to Form?—What is the Connexion between Placenta and Uterus?—Do the Blood-vessels of the Mother penetrate the Placenta?—Hunter's Opinion confirmed by Dr. Reid and Professor Goodsir—Professor Dalton, his Injection of the Utero-Placental Vessels by Air—Fatty Degeneration of the Placenta—Is it Normal or Pathological?—The Umbilical Cord; how Composed—Its Uses—Nomenclature of the Anatomist and Physiologist—Difference between—Variations in Volume and Length of the Cord—Twisting of the Cord around the Fœtus—Dr. Weidemann's Statistics of—Does the Cord possess any Trace of Nervous Tissue—Dr. Simpson on Contractility of the Cord—Scanzoni's Opinion—Virchow.

GENTLEMEN—We shall to-day speak of the annexæ, or appendages of the fœtus. These consist of the membranes, the liquor amnii, placenta, and umbilical cord. Each one of these appendages has its own special duty to perform during the progress of the reproductive evolution; when this latter is completed, their presence ceases to be necessary, and they are, therefore, expelled from the uterus at the time of childbirth. The membranes are three in number: 1. The decidua, or caduca; 2. The chorion; 3. The amnion. These three membranes constitute so many concentric layers, and form the coque, or, if you please, the shell of the fœtus. The

was still excoriation of the skin around the navel, but no division of the linea alba whatever, the continuity of the ring being perfect. The coverings of the hernia were composed of skin, fascia, and peritoneum. The tumor consisted of more than two-thirds of the uterus, the lower part lying within the grasp of the umbilicus. The patient being placed in the most favorable position for reduction, *gentle* manipulation was exercised, after which, to the astonishment of those present, the whole protruding organ was returned, with comparative facility, into the abdomen, the ring yielding equally all round to allow of the return of the hernial mass. No portion of intestine had protruded with the uterus. A bandage was applied to the seat of the hernia, which acted well; the patient went on to the full time, and, after a *favorable* labor, gave birth to a healthy female child.

mode of their origin, together with their particular uses, is not unworthy of attention.

1. *Membrana Decidua*.—Until quite recently, it was very generally conceded that the membrana decidua was produced in the manner originally explained by Dr. William Hunter. He maintained that this membrane was a new formation, and resulted in the following manner: At the time of fecundation, the internal surface of the uterus becomes the seat of increased vital action, which results in the exudation of coagulable lymph; this coagulable lymph constitutes a closed sac, and is the veritable decidua, or, as it is sometimes called, *caduca*; this membrane Dr. Hunter termed the decidua vera, in contradistinction to another fold, the decidua reflexa. This latter is produced, according to his theory, as follows: the *caduca vera* forming a closed sac, and occupying the entire cavity of the uterus, it follows that the three openings of the uterine cavity are completely occluded; these three openings being the os tincæ, and the two superior and lateral angles, which are continuous with the two fallopian tubes. Under this arrangement, it would become a necessary consequence that nothing could enter the cavity of the uterus, unless it either perforates or pushes before it this closed sac, or membrana vera. Hunter, therefore, attempted to show that, as the fecundated ovule is impelled by the fallopian tube toward one or other of the lateral and superior angles, as soon as it reaches this angle, it secures its entrance into the uterus by pushing before it a fold of the membrana vera, and it is this fold which he has denominated the membrana reflexa. This was the exposition of Hunter; and, as I have already remarked, until within a very short time, it was the accepted theory.

Such, however, is the progress of mind, as is constantly developed in the revelations of scientific research, that what was formerly regarded as the true description of the decidua, is now found to be utterly at variance with facts. It has been satisfactorily demonstrated by Coste, Professors E. H. and Ed. Weber, Sharpey, and others,* that, so far from this membrane being the product of a new formation, it is simply the result of a modified or hypertrophied condition of the mucous lining of the uterus. They have shown that the decidua is not a closed sac, but is continuous with the mucous covering of the fallopian tubes; and still more, that its structure is similar to that of the mucous membrane of the uterus itself, containing the same glands and the same layers; and, therefore, Hunter's theory of the reflexa is as fallacious as is that of the original formation of the decidua vera itself.

A very short time after fecundation, the tubular surface of the mucous membrane of the uterine cavity becomes thickened, and its

* Müller's Elements of Physiology, pp. 1574-80.

vascularity much increased. The entire internal surface of the organ is covered with a soft, pulpy tissue, in which may be observed numerous cellular elements. It is in this peculiar tissue that the ovum becomes imbedded; and it is this modified mucous lining, which constitutes the decidua vera.

Under the microscope, the mouths of the tubes can be distinctly recognised, as also their white epithelial lining. The follicles become much enlarged, and there is poured out from them into the cavity of the uterus a fluid, which serves, as we shall afterward see, through the absorption of the villi of the chorion, for the nutrition of the embryo during the earlier periods of its existence, previous to the formation of the placenta.

Decidua reflexa.—There has been much difference of opinion as to the mode of origin of the decidua reflexa. It is now admitted, as I have told you, that the explanation of Dr. William Hunter is not the correct one; and, perhaps, the views of Coste upon the subject are the most reliable of any that have been advanced within late years. According to him, as soon as the ovum enters the uterus, it becomes partially imbedded in the soft, pulpy mucous membrane, constituting the decidua; the particular portion of the decidua with which the ovum thus comes in contact is immediately the seat of increased nutrition, which causes it to grow or spring up around the ovum, not unlike the fleshy granulations, which are observed to arise around the pea put into an issue for the purpose of increasing the purulent discharge. This increase of a small part of the decidua vera continues until the ovum is completely enveloped by it; and this growth is what Coste denominates the reflexa.* These two layers of decidua, the vera and reflexa, approach nearer to each other as the ovum increases in development, so that, at about the end of the third month, there is absolute contact between them, forming but one membrane. At the time of parturition, the membrana decidua is expelled from the uterus, and hence its name. The blood-vessels of this membrane gradually cease to be supplied with blood, and, at the period of delivery, the quantity is so exceedingly slight, that no hemorrhage accompanies its expulsion.

Uses of the Decidua.—There can be no doubt that the chief uses of the decidua are to provide, as it were, a bed for the ovum in the earlier periods of its development, and, through the numerous glands distributed on its surface, to afford the necessary nourishment previous to the organization of the placenta, which, we shall tell you, has no existence at the commencement of gestation.

II. *The Chorion.*—It has just been shown that the membrana decidua is nothing more than a modification in structure of the mucous investment of the uterus, and, therefore, it is, strictly speak-

* Comptes Rendus, 1847

ing, furnished by the mother. The chorion, on the contrary, together with the amnion, appertains exclusively to the fœtus, and, hence, these membranes are, with propriety, denominated its proper tunics; the chorion is the most external membrane of the ovum, and forms one of its constituents from the earliest appreciable moment of fecundation. It is a thin, transparent investment, not unlike a small hydatid; it passes over the fœtal surface of the placenta, and also affords an external sheath to the umbilical cord. The chorion is intended to discharge, in the earlier periods of embryonic life, a most important and necessary office, which is the nutrition of the embryo itself; and, hence, for this purpose, one of the first changes it undergoes is the production over its cellular surface of villous prolongations, giving to it the peculiar shaggy appearance, which forms, in the first periods of conception, one of its prominent characteristics. These villi constitute so many absorbing radicles, through which the fluids furnished by the parent are conveyed from the decidua vera to the embryo, thus supplying the latter with the necessary elements of development; and this mode of nutrition continues, as I have told you, until the formation of the placenta.

It has been demonstrated by Professor Goodsir, that each one of these villi or tufts is composed of numerous nucleated cells in different stages of development, inclosed within a layer of basement membrane. At first, the chorion and villi bear no evidences of vascularity, being entirely composed of cells, covered on their external surface by a delicate structureless membrane; soon, however, vessels, conducted by the allantois, give rise to vascular loops in these villi. On that portion of the chorion, from which ema-

nates the placenta, the villi increase very much in number, while on the other portion they preserve their original condition. Each of these placental villi is supplied with a vascular loop, between which and the umbilical vessels there is a direct continuity; and the blood of the fœtus is forced through the vessels in the villi by the agency of the fœtal circulation.

III. *The Amnios.*—This is the most internal membrane of the ovum; it is smooth and transparent (Fig. 44), and is in slight



FIG. 44.

The Amnios enclosing the Fœtus.

adhesion with the chorion, by means of the mucous filaments covering its outer surface. The internal surface of the amnios is separated

from the fœtus through the intervention of a fluid—the liquor amnii—to the origin, and special uses of which we shall presently refer. Like the chorion, this membrane passes over the fœtal portion of the placenta, and also aids in forming the sheath of the umbilical cord.

Bag of Waters.—These two membranes, together with the decidua, constitute the envelopes of the fœtus during the term of gestation, and, at the time of parturition, they possess an importance well worthy the consideration of the accoucheur. For example, they, in conjunction with the liquor amnii, form what is known as the membranous sac, or, in more popular phraseology, the “bag of waters.” This “bag of waters,” as we shall have occasion to explain when speaking of the phenomena of natural labor, discharges a very important office in the influence it contributes toward inducing a proper degree of dilatation of the mouth of the womb. As a general principle, it is not characterized by much power of resistance, and, consequently, becomes ruptured at the proper time by the simple contractile efforts of the uterus. But it will occasionally happen that, owing to a greater degree of tenacity, it proves rebellious to every effort of the contracting womb, and the accoucheur is called upon to rupture it with his finger during a pain, and sometimes, indeed, it will be necessary to incise it, such being the nature of its resistance.

The Liquor Amnii.—The origin of this fluid is a question, which has called forth much difference of opinion. Some observers maintain that it is the production of the fœtus; others, that it is furnished by the mother; and, again, there are some who argue that it is the joint production of mother and child. It is admitted that the quantity of liquor amnii is relatively greater in the earlier months than at the latter periods of gestation; and, in addition, it is well to remember that the general quantity of this fluid at the time of childbirth is subject to remarkable variations. Sometimes, after the rupture of the membranes, the escape of fluid will be so slight that this circumstance gives rise to what the old women denominate a “dry labor;” at other times, there will pass from the uterus several quarts. In these latter cases, it will have been observed that the patient suffered during her gestation from more than ordinary distension of the abdominal walls. This sudden gush of fluid has more than once struck terror into the young practitioner, causing him to mistake the discharge of the amniotic liquor for a case of fearful flooding; and, occasionally, under this delusion, inducing him to request a consultation, imagining the patient to be in imminent danger! With a moment’s forethought, all embarrassment will at once cease, for it is only necessary to make a slight examination of the clothes to ascertain at once that the discharge, in lieu of blood, is colorless.

Source of the Liquor Amnii.—The true source of the liquor amnii appears to be derived from the parent; and it is claimed to be nothing more than an exhalation, or, as Velpeau terms it, a vital imbibition, requiring no special canals for its passage. This fluid is found, at times, mixed with meconium, and there is no doubt, that there is an excretion of urine from the fœtus commingling with the liquor amnii. Under the microscope, besides other materials, clear, transparent, elongated cylindrical bodies—the casts of the uriferous tubes of the kidney of the fœtus—have been distinctly recognised, and the detection of these substances is very conclusive evidence that there is a mixture of the urinary secretion, and the amniotic liquor. Again: there are facts recorded upon perfectly reliable authority, in which the death of the fœtus, while in utero, was occasioned by rupture of the bladder from over distension, in consequence of an imperforation of the urethra, thus preventing the escape of the urine.

According to Vogt, the liquor amnii contains common salt, lactate of soda, albumen, sulphate and phosphate of lime; and even the presence of urea has been detected in it; Bernard has recently observed glucose in this fluid. Vogt has also shown that the elements vary during the different periods of gestation; for example, the chloride of sodium is in greater proportion during the first months, being the period when cell-development and growth are more active. Whether the liquor amnii be engaged in affording nourishment to the embryo, we shall examine when speaking of the nutrition of the fœtus.

Uses of the Liquor Amnii.—The uses of this fluid are various: 1. During gestation, it serves to protect the fœtus against the effects of any sudden concussion, which may befall the mother; 2. It prevents the adhesion of those parts of the fœtus, which are intended to remain separate; 3. It affords facility for the fœtal movements in utero; 4. It protects the umbilical cord from undue pressure, thus ensuring a free circulation of blood from the fœtus to the placenta; 5. At the time of labor, the liquor amnii performs the important double office of aiding materially, by its uniform and gentle pressure, in the dilatation of the mouth of the womb, and, after the rupture of the “bag of waters,” it lubricates the vagina and vulva, thus facilitating the ultimate distension which they are so soon to undergo.

Placenta.—The placenta, or after-birth, the latter name being given to it for the reason that, as a general rule, it is expelled from the uterus after the fœtus, is a flat, spongy mass, generally circular in shape, but sometimes assuming the oval form. It is the medium of communication between the mother and child—its special office being to supply nourishment to the fœtus, during its intra-uterine existence. The placenta is peculiar to the mammiferous class, but in

these it presents much variation, both in its form and dimensions. In the ruminating animals, it assumes the appearance of small unequal masses, and is consequently multiple. In the mare, it exhibits a reddish, granular layer, which is found to cover the entire surface of the chorion. We, however, are to examine it as it presents itself in the human subject. The term placenta is derived from its supposed resemblance to a flattened cake—this name having been applied to it by Fallopius. It usually measures from six to eight inches in diameter, and, at its centre, is from one inch to one inch and a half in thickness, gradually becoming less so toward its border or circumference. But while these may be considered the standard measurements, it must be remembered that there are occasionally exceptions; for example, the after-birth at full term will sometimes greatly exceed these dimensions, while again it will fall short of them.

Divisions of the Placenta.—The placenta is divided into two surfaces—the foetal and maternal. The foetal surface (Fig. 45) is sometimes called the membranous, because the chorion and amnios both pass over it; it likewise has received the name of arborescent, for the reason that the distribution of the two umbilical arteries, and one vein, give to it that peculiar appearance resembling the branches of a tree. This surface of the placenta is smooth, and, as it were, glistening. The maternal portion, sometimes



FIG. 45.



FIG. 46.

denominated uterine, is in contact with the uterus; and, while the integrity of the contact is preserved, this surface is also smooth, its lobes or cotyledons being more or less in close juxtaposition. But, if the after-birth be examined, subsequently to its detachment from the uterus, the maternal surface will exhibit an irregular, broken aspect, and distinct separations recognised among the various lobes composing it. (Fig. 46.)

Blood-vessels of the Placenta.—Physiologically speaking, it may

be said that the placenta is divided into two distinct portions; one appertaining to the fœtus, and the other to the mother; for, as we proceed further in the examination of this subject, it will be shown that there are two distinct, independent circulations in the organ; one on the fœtal surface, composed of the vessels in the umbilical cord; the other, on the maternal surface, composed of the utero-placental vessels. Between these two orders of vessels there exists no continuity of canal, and, therefore, the two circulations are independent of each other. I think there is no fact better established than this absence of continuity of vascular connexion between the parent and fœtus. A contrary opinion has been attempted to be proved by the result of injections thrown into the vessels of the umbilical cord, and which have been alleged to pass directly into the blood-vessels on the maternal surface of the placenta; but on a close analysis of these experiments, it has been most satisfactorily shown that, in every case in which the injection has been recognised in the vessels of the mother, it was through simple extravasation. An additional proof, if one be necessary, is furnished by the fact of the marked difference in the size and relative number of the red corpuscles, and, also, in the amount of fibrin and albumen, as found in the blood of the parent and fœtus.

These circumstances, now accepted as well-demonstrated facts, surely prove the want of continuity between the vessels on the maternal and fœtal surfaces of the placenta; and the fact, thus established, involves an important consideration connected with the passage of blood from the system of the mother to the fœtus, to which your attention will be directed under the head of the fœtal circulation. Flourens and others, it may here be stated, have recently shown that if madder be given to a pregnant animal, the bones of the fœtuses become colored by it as much, if not more, than those of the mother, thus proving the permeability of the maternal and fœtal blood-vessels in the placenta.

It is not until the second month that the formation of the placenta commences.

Although the circulations on the fœtal and maternal surfaces of this body are not carried on through continuity of canal, yet it must be borne in mind that these two portions of the ovum are mingled, the one with the other, in close alliance throughout their whole substance; and, in this respect, the human after-birth differs essentially from the placenta of some of the lower classes of animals, in which the uterine or maternal portion consists of the hypertrophied decidua, while the fœtal surface is composed of the vascular tufts of the chorion, which, as it were, are found to dip down into the thickened decidua. So that, in this latter case, there is no difficulty in separating these two portions of the organ.

Fœtal and Uterine Surfaces of the Placenta.—According to the

most recent observations, the following appears to be the mode of origin of the fetal surface of the placenta: The villous tufts, which spring from the chorion, and to which allusion has already been made when speaking of this latter envelope, are composed, according to Prof. Goodsir, of numerous nucleated cells. There is observed at the terminal extremity of each of these villi, a sort of bulbous expansion, and, through the development of additional cells, the villi become elongated, and dipping down into the decidua, absorb from it nourishment, which is carried to the germ, this is what occurs in the earlier stages of fetal development, for, at this time, as the villi contain no vessels, the nourishment is derived simply through the process of absorption. But soon the villous tufts are supplied with a vascular apparatus; each villus is furnished with one or more capillary loops, which communicate with an artery on one side, and a vein on the other. In this way, through the increase and extension of the vascular villi of the chorion, the fetal portion of the placenta is formed; while the maternal or uterine originates from the enlargement of the vessels in the hypertrophied decidua, between which, as has already been remarked, these villi dip down. Prof. Goodsir says, "these vessels assume the character of sinuses; and at last swell out (so to speak) around and between the villi; so that, finally, the villi are completely bound up or covered by the membrane, which constitutes the walls of the vessels, the membrane following the contour of all the villi, and even passing, to a certain extent, over the branches and stems of the tufts. Between the membrane or wall of the large decidual vessels, and the internal membrane of the villi, there still remains a layer of the cells of the decidua."* This, then, appears to be briefly the mode of origin of the maternal portion of the placenta. But a very natural question now arises—how is the blood conveyed from the system of the parent to the uterine surface of the after-birth, and what is the particular mode of union between this latter and the uterus itself? It is brought through what are termed the curling arteries of the uterus, and deposited into the placental cavity, and it is afterward returned through the large veins, generally called the sinuses.†

* Anatomical and Pathological Observations, p. 60.

† It has been, for a long time, a controverted point, as to the particular mode of connexion which exists between the internal surface of the uterus and the maternal portion of the placenta. It is quite evident however, that the original opinion of Dr. William Hunter has been fully demonstrated by the experiments of Dr. Reed and Prof. Goodsir. Hunter maintained that the blood-vessels of the uterus passed into the substance of the placenta, and formed a portion of its mass; but repeated attempts have been made to show that his opinion was erroneous, founded, as it was, upon the injections, which were made to pass from the uterine vessels into the maternal portion of the placenta—it being alleged that these injections reached the placental mass, not through continuity of vessels, but because of extra-

Thus, gentlemen, you have seen that the placenta not only presents two surfaces—one belonging to the fœtus, and the other to the mother—but you have also observed that these two surfaces possess two circulations, distinct and independent; the one carried on by the two arteries and one vein of the umbilical cord, the other by the maternal arteries and veins, sometimes designated the utero-placental vessels. Under this arrangement, the fœtus derives from the placenta the elaborated blood necessary for its nourishment and growth in the manner we shall presently explain.

Fatty Degeneration of the Placenta.—It is worthy of note that, as pregnancy draws toward its close, the placenta becomes more hard, and its capillary vessels undergo a peculiar alteration, which consists in the appearance of numerous oil globules in the coats of the vessels, constituting what is termed fatty degeneration of the fœtal tufts. This change in the physical condition of the placenta, has been regarded as an evidence of diseased structure; but recent observation proves that, in the great majority of cases, this fatty substitution occurs in the placenta as one of the phases through which it finally passes. Dr. Druitt and others have called special attention to this subject. Sound pathology has unquestionably demonstrated that fatty degeneration is oftentimes the result of morbid action; but it must also be recollected, that it constitutes one of the peculiar processes to which tissues are subjected, after their functional activity is at an end, and prior to their absorption. This is well illustrated in the case of the muscular fibre-cells of the impregnated uterus, when the organ, having accomplished the purpose for which it underwent increase, is about to return to its original size.

Dr. Barnes, of London, has recently given the profession two extremely interesting papers on the subject of fatty degeneration of the placenta, in connexion with the pathological changes to which this mass is liable; and he has pointed out very cleverly the relation between this metamorphosis of the placenta and abortion.*

Umbilical Cord.—The cord is the direct channel of communication between the after-birth and fœtus. One of the extremities is attached to the placenta, while the other is in connexion with the umbilicus of the child. It is composed of three vessels, two arteries, and one vein—the arteries are branches of the hypogastric or internal iliaes, and bring the impure blood from the fœtus to the placenta; the vein originates in the fœtal portion of the placenta,

vasation. Recently, Prof. Dalton, in an interesting paper read before the New York Academy of Medicine, fully confirms the views of Hunter, by means of air thrown from the divided vessels of the muscular walls of the uterus into the placenta itself. See *Anatomy of the Placenta*, by Jno. C. Dalton, M.D.

* *Medico-Chirurgical Transactions*, vols. 34–36.

and conveys arterial blood from this organ to the system of the fœtus. The student is sometimes apt to become confused when told that the vein contains arterial blood, and the arteries are the channels through which is conveyed the impure or venous blood. But, it must be remembered that the nomenclature of the anatomist is not the nomenclature of the physiologist. The former designates every vessel an artery, without regard to its office or function, which proceeds from the heart toward a given point, and applies, in the same way, the term vein to every vessel whose direction is toward the heart. The physiologist, on the contrary, considers an artery a vessel for the transmission of arterial blood; and a vein, the channel through which passes impure or venous blood. As the science of anatomy is much more ancient than that of physiology, and, as its nomenclature consequently enjoys the precedence, it is right that the distinction, to which we have just alluded, should not be forgotten.

In addition to its three blood-vessels, the umbilical cord has a sheath composed of reflections from the amnion and chorion, and a pulpy gelatinous material, known as the gelatine of Wharton. As a general rule, the volume of the cord equals in thickness that of the small finger; but, sometimes, it will be much greater, and, again, it will be less than this size. When the volume is increased, it is usually due to an infiltration of fluid, and by no increase of size in the vessels themselves, although this latter circumstance has occasionally been observed.

On the contrary, when the cord is very small or slender, it is because of the entire absence of this infiltration. The ordinary length of the umbilical cord is from fifteen to twenty inches, which is about the average length of the fœtus at full term. But there are occasional exceptions. For example, cases are recorded in which it exceeded in length five feet, and again it has measured not more than from four to six inches. In the former instance, although the length of the cord is actually far in excess of the normal or average standard, yet it may become comparatively shorter in consequence of being coiled around some portion of the fœtus.* In

* According to Dr. Weidemann, the funis was found twisted around the child 3379 times in 28,430 deliveries. In these 3379 instances, it was coiled around the neck 2330 times, and 149 times around other portions of the body. In the 3270 cases, 2546 consisted of a simple coil, while in 684 instances, there were several coils.

As regards the causes of the coiling of the funis, it is related that in 1788 cases, occurring at the Marburg Midwifery Institution, the cord was, in 80 instances, less than 15 inches in length, and in 183 over 25 inches; in 54 cases, the liquor amnii was small in quantity, in 41 it was copious. In 165 the child weighed less than five pounds, and in 28 it exceeded eight pounds. Therefore, it is deduced, that among the causes tending to the occurrence may be mentioned a long funis, abundance of liquor amnii, and a small child.

Among 2930 children born at Marburg, 132 were dead, and 251 were still-born.

the latter case, in consequence of the extreme congenital shortness of the umbilical cord, there will be more or less hazard of its sudden rupture during the throes of labor in some portion of its extent, or of its being torn from the umbilicus, giving rise to serious, if not fatal, hemorrhage. If neither of these accidents should occur, there would still be danger of suddenly detaching the placenta from the uterus, or, if the adhesion be strong enough to resist the traction, the next evil in the order of sequence would possibly be inversion, or turning inside out of the uterus itself, a contingency full of danger to the mother, as will be explained when treating more particularly of this form of uterine difficulty.

You will sometimes recognise knotted cords, that is, there will be observed in the extent of the funis one or several knots, and these are more particularly noticed in cases in which the cord



FIG. 47.

exceeds its ordinary length. (Fig. 47.) It is supposed that this latter circumstance, together with the movements of the fœtus, predisposes to the formation of these knots. I have several times

Of 725 born with coiled funis, 45 were dead, and 72 still-born. Among the 45 dead-born, in the 725 examples of coiling, in 18 only could the death be referred to this latter circumstance alone.

From results derived from the Midwifery Institutions at Dresden, Gottingen, Wurzburg, Berlin, and Marburg, it appears that of 13,720 new-born infants, 902 were born dead; while in 1217 instances of coiling of the funis, 31 children were born dead, whose death could be ascribed to that circumstance, giving a proportion of 1·59 to the coilings, and 1·19 to the number born dead.

Thus, as the sixteenth child among new-born children, in general, as well as among those in which the cord is found twisted, is born dead; as the twelfth child among the new-born, in general, and the tenth among those around which the funis is coiled, is still-born; and, as in one child in forty only can this coiling be regarded as really the cause of death, it follows that this accident is not entitled to prominent consideration. [Monatsschrift für Geburtskunde.]

met with them, but in no instance have I known them to interrupt the circulation between the mother and child.

The placental extremity of the funis is usually attached to the central portion of the after-birth, although occasionally it will be found inserted near the edge or border of the organ. Cases are recorded in which it is alleged that the fœtal extremity of the cord, in lieu of entering the umbilicus of the child, was observed attached to the limbs, head, etc. But these instances do not come to us with the seal of good faith, and I should be strongly induced to doubt the statement unless in cases of extraordinary monstrosities.

Is there Nervous Tissue in the Cord?—Does the umbilical cord possess any vestige of nervous tissue? This is an extremely interesting question from the fact that it is now well known that both the vein and arteries, composing the cord, are capable of contraction. An interesting paper on this subject, demonstrating that these vessels are really imbued with contractile power, was published some time since* by Prof. Simpson. In that paper, he does not admit the presence of nerves in the funis, but contents himself with the bare hypothesis that elementary nervous tissue may in some form exist in it. Scanzoni† says, “Isolated nerve branches from the plexus hepaticus for the vein, and from the plexus hypogastricus for the arteries, are described by Schott and Valentin, and, according to the latter observer, they extend three or four inches from the umbilicus, as is revealed by the microscope.” Virchow, however, does not admit these views, because he has never succeeded in detecting nerves in the umbilical cord at any period of its development.

* Edinburgh Jour. of Med. Science, May, 1851, p. 494.

† Lehrbuch der Geburtshilfe, p. 104.

LECTURE XVIII.

Nutrition, a fundamental law of life—Objects of Nutrition; Growth and Development—Development physiologically considered—Nutrition of Embryo; various Opinions concerning—Yolk Nutrition—Nutrition through Villous Tufts—Liquor Amnii; has it nutrient properties?—Does it enter the System of the Fœtus by Cutaneous Absorption or Deglutition?—The Placenta and Fœtal Circulation—Adult Circulation; how it differs from that of the Fœtus—How is the Impure Blood, returned by the Umbilical Arteries, decarbonized in the Placenta?—Endosmose Action—Albumen cannot pass by Endosmosis; Opinion of Mialhe—Albuminose—Influence of Parent upon Progeny—Transmission of Hereditary Disease—Change in the Circulation as soon as Respiration is established—Puer Caruleus—Does the Fœtus Breathe in Utero?—Intra-uterine Respiration not Essential to Development or Life of Fœtus.

GENTLEMEN—Nutrition, whether in the vegetable or animal kingdom, is one of the absolute and fundamental necessities of life; to pursue the topic of development, through the process of nutrition, in the various conditions and phases of animated nature, would prove, if not foreign to the purpose of these lectures, a most interesting inquiry. Such a discussion, however, would divert us from our present object, and we shall speak, therefore, simply of the arrangements instituted by nature for the nourishment of the human embryo, from the earliest moments of fecundation until the final accomplishment of intra-uterine existence.

The Objects of Nutrition.—Nutrition has no single purpose; you are not to suppose that it is for the promotion of mere growth. If this were so, the result would be simply an aggregation of the primordial elements, without form or symmetry—the architecture of the system would be defective—that beautiful and perfect mechanism, composed, as it is, of multiplied tissues and organs, would fail to exist, and in lieu of all this there would be substituted a sort of anomalous mass, without order or arrangement. You see, therefore, that, besides growth, nutrition, in order that the great object of nature may be carried out, must subserve another most important purpose, viz. development. Development, in a physiological sense, may be said to be the proper adjustment or distribution of growth matter for the formation of the various tissues and organs of the economy; so that, when growth and development have completed the structure of the various parts of the human system, it may then be said that nutrition has efficiently performed a portion of its work. It, however, has something more to do.

The human system, like all living things, is constantly undergoing change—every hour that we live there is waste of structure—this waste, if not supplied by new matter—which can only be done through nutrition, will lead to disintegration and decay. In a word, it may be affirmed, that the object of nutrition is three-fold: 1. Growth; 2. Development; 3. Repair of waste.

Beginning with the simple cell, the original nucleus, if I may so term it, of the embryo, we perceive, through the successive stages of growth and development, the transmutation of that comparatively insignificant cell into a type of the most perfect organization, as is disclosed in the mechanism of man!

The subject of embryonic nutrition has called forth many conflicting opinions; and even in our own day, with all the lights which science has furnished, there still exists more or less discrepancy among observers. There is one fact, however, not only full of interest, but well worthy of observation, and it is this—that, throughout the whole life of man, there is no period in which nutrition results in such rapid growth and development as during intra-uterine existence; and this is still more marked in the first half of foetal life. But when nature is unchecked in her operations, this rapid development interferes in no way with the perfection of the work in which she is engaged. In the brief period of nine months, the small cell, through successive increase and development, is converted into the full-grown foetus. What an extraordinary achievement, and how demonstrative of the power of Him, to whose infinite wisdom all things earthly are due!

Modes of Nutrition.—In order to present the subject of foetal nutrition in the simplest possible form, and to convey to you what I believe to be the accepted opinions, at the present day, on this subject, I shall briefly consider the ovum in three different aspects: 1. From the moment of fecundation until its arrival within the uterus; 2. From its entrance into the uterus, until the formation of the placenta; 3. From this latter period, until the completion of the ordinary term of utero-gestation. These, then, are three distinct periods of development, each one requiring a supply of elements necessary for the nourishment and growth of the new being.

From the period that the fecundated ovule becomes detached from the ovarian vesicle, until its entrance into the uterine cavity, it may be said to be dependent upon what is known as yolk nourishment. But this particular species of nourishment soon becomes exhausted in the case of the human embryo, so that when the latter is lodged within the cavity of the uterus, a fresh source is found necessary, which is promptly provided, through the absorption of juices from the decidua by means of the villous tufts on the exterior of the chorion, to which allusion has already been made. This

tuft nutrition is in more or less active exercise until the second month, when a new arrangement is made through the vascular connexions, which subsist between the embryo and uterus, as a consequence of the formation of the placenta and umbilical cord.

Does the Liquor Amnii contain Nutrient Properties?—A very ancient doctrine touching the nutrition of the fœtus, and maintained with much zeal, referred the source of nourishment to the liquor amnii; the advocates of this opinion were divided into two sects, as to the mode in which the amniotic fluid entered the system of the fœtus, with the view of affording it the necessary nourishment. One declaring that it was through cutaneous absorption, the other through the act of deglutition. It is not improbable that the liquor amnii does in reality contribute a share, during the earlier periods of embryonic existence, to its nourishment; for it is well ascertained that it contains nutritious elements, such as albumen, salts, etc. Nor is it beyond possibility that some portion of the amniotic fluid may be swallowed by the fœtus. On the other hand, there are well-authenticated instances in which this fluid has been recognised in the stomach and intestines, in cases of acephalous children; and also where there existed, from malformation, no communication between the œsophagus and stomach. These latter facts, it has been alleged, strengthen the hypothesis of cutaneous absorption. But it is quite evident that the cutaneous absorption of the liquor amnii cannot be sustained by any such testimony. In the first place, even in acephalous children, the amniotic fluid may reach the stomach through the œsophagus; and, secondly, in cases in which there is an occlusion of this tube, the liquid found in the stomach cannot be the amniotic, for the important reason that, if it be absorbed by the skin, it will commingle with the blood, and not be taken to the stomach.

Whatever influence may be exercised by the liquor amnii in affording nourishment to the embryo, it must be admitted that this influence is confined to the earlier periods of embryonic life; for, as soon as the placenta is formed, all the wants of the fœtus, as we shall see, are abundantly provided for through this vascular connexion.

Nutrition by the Placenta.—The placenta, as you know, is composed of a maternal and fœtal portion, each of these surfaces having its own particular order of vessels, through which a distinct circulation is carried on. The utero-placental vessels are engaged in the distribution of blood on the former, while the circulation on the latter is conducted by the vessels of the cord, viz., the two umbilical arteries and one umbilical vein. The blood is brought from the system of the parent, and circulated through the maternal or uterine surface of the placenta by the utero-placental arteries—it is conveyed back to the system of the mother by the utero-placental

veins. Prof. Goodsir has shown, as already stated, that the uterine arteries proceed from the walls of the uterus through the hypertrophied decidua; and, during their progress through this layer of membrane, they take a sort of tortuous or serpentine direction, and hence they have been denominated the "curling arteries" of the uterus. These arteries convey the blood from the system of the mother into the cavernous structure of the placenta, and the blood is again returned to the general maternal circulation through the large veins, which have received the name of sinuses.

Thus, you perceive, nature has abundantly provided the maternal surface of the placenta with blood from the system of the parent; but, as yet, you do not understand, in the absence of all continuity of canal between the two orders of vessels on the foetal and uterine portions of the after-birth, in what way the foetus is benefited by this supply of blood, or, in other words, how it finds passage to the foetal system for the purpose of providing it with necessary nourishment. This, however, it will be our purpose to elucidate before we complete the present lecture.

Adult and Foetal Circulation.—Allow me now to call your attention to the foetal circulation. This circulation is marked by certain characteristic differences, which are not found in the case of the child or adult; and these differences are owing to the important fact, that, in the foetus, existence is a dependent one—it has no power of elaborating the blood essential for its maintenance—this is done by its parent. On the contrary, in the healthy, well-organized child, and in the adult, where life is independent, and the individual elaborates its own blood, there is a peculiar arrangement in the mechanism of the vascular and pulmonary systems adapted to this condition of life.

You will, perhaps, have a more accurate idea of what I mean by a brief contrast between the circulatory apparatus as it obtains in the adult and foetus. In both, there is a great central organ—the heart; and in both, also, there are two orders of vessels, viz. arteries and veins. In the adult heart there are four cavities, two on the right side, and two on the left. On the right side there are an auricle and ventricle, which communicate with each other, and which are intended for the reception of venous blood; and on the left side there are also an auricle and ventricle, communicating with each other, and containing arterial blood. These four cavities communicate with each other only through the auriculo-ventricular openings.

Now, then, let us turn, for the instant, to the arrangement in the foetal heart. Here, as in the adult, there are four cavities: two on the right and two on the left, communicating, as in the case of the adult, by means of the auriculo-ventricular openings. But, in addition, in the foetal heart, the right auricle communicates with

the left auricle, through a small opening known as the foramen ovale. The only difference, then, in the arrangement of the heart proper, as it presents itself in the adult and fœtus is, that, besides the auriculo-ventricular openings, there is in the fœtus the foramen ovale, which is the point of communication between the right and left auricle.

In the adult, the following is the route of the circulation—the veins return from the upper and lower extremities the blood which has been distributed throughout the system for the purpose of nourishment, but which, in its round of circulation, has become less charged with oxygen, and contains more carbonic acid, and, therefore, is in need of renovation. The veins, I say, return this blood from the upper extremities to the descending vena cava, and from the lower to the ascending vena cava—these two vessels, the descending and ascending cavæ, empty their contents into the right auricle of the heart; thence it passes, through the auriculo-ventricular opening, into the right ventricle; from the right ventricle, it is conveyed by the pulmonary artery, which bifurcates into a right and left branch, into the lungs; and here, in consequence of the absorption of oxygen and the exhalation of carbonic acid, the venous blood is converted into arterial, which is conveyed through the pulmonary veins to the left ventricle; from the latter, it passes into the aorta, through the ramifications of which it is conducted to every portion of the economy, imparting sustenance to each tissue and organ.* As soon as it has completed its circuit, it again requires renovation, and for this purpose is returned to the lungs—and so the work of elaboration continues, in more or less perfection, from the first moment of independent existence until the final close of life. This, gentlemen, is briefly the circulation in the adult or the child, whose life is independent of its mother.

Let us now follow the course of the blood in the system of the fœtus. Besides the peculiarities already pointed out in the circulatory apparatus of the latter, there is the ductus arteriosus, which appears to be nothing more than an extension of the pulmonary artery, and which conveys all the blood, except the small quantity going to the lungs, from the right ventricle to the arch of the aorta. Then, there are the umbilical vein, and two umbilical arteries.

The blood is conveyed from the placenta to the fœtus in the following manner: The arterial or elaborated blood is carried by the umbilical vein, which enters the system of the fœtus at the umbili-

* Respiration consists essentially in the absorption of oxygen and the exhalation of carbonic acid; but this latter is not formed, as was once supposed, by the combination of carbon and oxygen in the lungs; a small amount of carbonic acid is produced in the lungs by the decomposition of carbonates, but its chief formation takes place in the tissues—the muscles, nerve-centres, etc.

cus. When this vein penetrates the umbilical opening, its course is at first from before backward, then from below upward, and from left to right. As soon as it reaches the inferior portion of the liver, it gives off a branch which distributes blood to the right lobe of this viscus; this same blood is afterwards conveyed through the hepatic vein, and deposited in the ascending vena cava. In order that you may not be led into error, and with the view of avoiding all confusion, I beg you to remember that the instant the umbilical vein sends off the branch to the liver, it takes the name of *ductus venosus*. This latter vessel, then, is nothing more than the original umbilical vein, the name being changed as soon as it has parted with the branch, whose duty it is to carry blood to the right lobe of the liver. The ductus venosus throws its contents into the ascending vena cava; and you must bear in mind that the blood thus deposited in the ascending cava comes directly from the placenta, and is therefore pure, fitted to the nutrition of the fœtus. I have just mentioned that the hepatic vein also deposits its contents in the ascending cava. Hence, then, there are three columns of blood all commingling with each other: 1. The blood, which is derived through the ductus venosus directly from the placenta, and which is pure; 2. The blood, which has circulated through the liver, and which is returned to the cava by the hepatic vein; 3. The blood which is brought from the lower extremities, and ultimately deposited in the ascending cava; the latter column of blood is of course less pure than the other two, for the reason that it has already been distributed to the lower extremities.

Well, this volume of blood, derived as you have just seen from three different sources, is conveyed by the ascending vena cava into the right auricle of the heart. But the upper portion of the cava, as it enters the auricle, is, through the arrangement of the Eustachian valve, rendered almost continuous with the foramen ovale, so that the blood it conveys into the right auricle, instead of mingling with that brought by the descending cava into the same chamber of the heart, passes almost entirely through the foramen ovale into the left auricle. Thence, through the auriculo-ventricular opening, it is conveyed to the left ventricle, and from this cavity it passes, through the aorta and its branches, to the head and upper extremities. The branches to which I allude, originate at the arch of the aorta, and are the brachio-cephalic trunk, or arteria innominata, the left primitive carotid, and left subclavian.

The blood, after being distributed through these channels to the upper parts of the body, suffers a diminution in its nutritive properties, and, therefore, needs elaboration; hence, it is returned by the jugular and axillary veins to the subclavians, which, together with the azygos vein, empty their contents into the descending vena cava—this latter conveys it into the right auricle, from which,

through the auriculo-ventricular opening, it passes into the right ventricle, and from this latter cavity it enters the pulmonary artery. The pulmonary artery conveys to the lungs, during fetal life, but a very small quantity of blood, only sufficient to supply them with nutriment, for the reason that they have no power of elaborating this fluid, as is the case in the lungs of the adult. Some provision, therefore, is needed by which the surplus blood from the right ventricle may be disposed of; for this purpose there is the ductus arteriosus, whose office it is to convey all the blood from the right ventricle, not passing to the lungs, to the arch of the aorta. This latter blood is then transmitted through the descending aorta, and, with the exception of the portion of it which is distributed by the external iliacs and their branches to the lower extremities, is conveyed through the two umbilical arteries to the placenta, for the purpose of undergoing fresh renovation. The two umbilical vessels, you will not forget, are formed by the internal iliac or hypogastric arteries.

Before calling your attention to the special arrangement in the placenta for the elaboration of the blood, returned to it by the umbilical arteries, I wish, for the moment, to allude briefly to one or two points connected with the route of the circulation in the *fœtus*. You cannot have failed to notice, in the distribution of blood through the system of the latter, the important fact that, to a certain extent, the head and upper extremities are supplied with purer blood than the lower portions of the body. The head and superior extremities do in reality receive blood almost as pure as that which comes directly from the placenta, and for the reason that their development is required to be in advance of that of the lower portions of the system. For example, a part of the blood which is derived directly from the placenta passes through the ductus venosus into the ascending cava, thence into the right auricle, and through the foramen ovale into the left auricle—from this latter chamber it is sent to the left ventricle; from the left ventricle it is conveyed through the arterial branches given off at the arch of the aorta to the head and superior extremities. But you are to bear in mind that, as the blood passes from the left ventricle into the aorta, a small portion of it must, of necessity, descend and thus commingle with blood emptied into this channel by the ductus arteriosus, and which you will recollect is brought there from the right ventricle, after it has been returned from the upper portions of the body. The blood thus conveyed from the right ventricle, through the ductus arteriosus, to the arch of the aorta, has, through its circuit, lost more or less of its nutrient elements; but yet, you perceive, it receives a small supply of pure blood from the left ventricle in the descending aorta—and therefore, although it is true that the blood which circulates through the head

and upper extremities is purer, because a portion of it comes directly from the placenta, yet it must be recollected that the lower part of the body is not exclusively dependent for its supply upon the blood from the right ventricle—and which has already partly exhausted itself in its circulation to the head, etc.—but it also receives a column of pure blood from the left ventricle as it passes to the aorta.

Elaboration of the Blood in the Placenta.—Next let us examine how it is that the impure blood, which is returned from the system of the fœtus to the placenta through the umbilical arteries, receives a fresh supply of nutritious matter; or, in other words, how it is that its decarbonization is accomplished. One of the theories brought forth to elucidate this question was based on the supposition, that the blood-vessels on the fœtal and maternal surfaces of the placenta were continuous with each other; and, on this assumption, it was maintained that the impure blood was conveyed directly from the fœtus to the system of the mother—thence to the maternal lungs, from which, after having lost its carbonic acid and receiving oxygen, it was returned to the placenta, whence, through the umbilical vein, it again made its circuit in the system of the fœtus. The deductions from this theory are utterly fallacious, for the assumption on which it is predicated, as I have already pointed out, is without foundation. The vessels of the fœtal and maternal surfaces of the placenta do not communicate with each other—they are distinct and independent, and so are their circulations. How, then, you may very legitimately inquire, if the blood from the fœtus be not returned to the circulation of the mother, does it become purified? The answer to this question is quite easy, and it may be regarded as one among the accepted truths of physiology.

During intra-uterine existence, the aeration or decarbonization of the blood is accomplished altogether in the placenta; and this organ may, in strict physiological meaning, be denominated the lungs of the fœtus.* The following is the process of elaboration. The impure blood, as you are aware, is brought from the system of the fœtus to the placenta, through the umbilical arteries; these arteries ramify, and communicate by continuity of canal with the radicles of the umbilical vein on the fœtal surface of the placenta; although there is no direct communication between the vessels respectively, on the two placental surfaces, yet there is a contiguity; and, in fact, these vessels may be said to be, as it were, in juxtaposition, so that the impure blood in the umbilical arteries becomes liberated of its carbonic acid, and is supplied with oxygen from the blood of the mother by an endosmotic action—that is, the

* As regards the functions of the placenta, it must be remembered that this body is, at the same time, the representative of the digestive and respiratory organs of the adult.

oxygen percolating the walls of the canals, displaces the carbonic acid which passes into the maternal system through the same kind of endosmotic process; thus, you perceive, one of the first results produced upon the blood of the fœtus is to afford an escape of its deleterious element, the carbon, which, in the form of carbonic acid, passes into the vessels of the mother, which it can do with impunity to her health.

The parent, however, is not content with receiving into her own system this element, no longer fitted to sojourn in that of her offspring; she does more—she transmits, through the same process of percolation, from her own blood, an element necessary for the continued sustenance of the fœtus. What is this element? Some say that it is albumen, which is known to be essential to fœtal nutrition. But Mialhe has shown that pure albumen cannot pass through membranes, and he has developed the interesting fact, that it is a substance, called *albuminose*, which has the power of percolating membranous tissues; it is this substance which passes from the blood of the mother to the fœtus, and from which the latter derives its nourishment. Robin and Verdeil have demonstrated that what was supposed by Guillot, Le Blanc, and others, to be casein in the blood of pregnant women and nurses, is essentially albuminose, which, after all, is strikingly similar to casein and kiesteine.

As soon as these changes have been effected in the blood brought to the placenta by the umbilical arteries, the elaborated fluid is immediately taken up by the radicles of the umbilical vein, and again conveyed to the system of the fœtus, and there distributed in the manner already indicated. In this simple but efficient way has nature provided, by the constant escape of deleterious, and the constant addition of nutritious matter, for the growth and development of the fœtus. In addition to the office which the placenta performs toward the fœtus, of giving albuminose in exchange for carbonic acid, it is supposed, by some observers—and the hypothesis is not without a degree of probability—that it also discharges, to a certain extent, the duty of an excreting organ, by removing, through the maternal blood, excrementitious material, which, if permitted to remain in the system of the fœtus, would prove destructive to its existence.* With this supposition, it is easy to comprehend how the system of the mother may become contaminated by disease derived from her husband; and how, also, this

* Bernard has recently attempted to show, that there exists, in the placenta of the mammiferous class, a peculiar function, which heretofore has been unknown, and which appears to supply the glycogenic action of the liver during the earlier periods of embryonic existence. Indeed, he and Ch. Rouget have demonstrated that a glycogenic matter exists not only in the placenta and amnion, but also in all the new cells in the various tissues of the embryo, especially in the epithelial cells.

disease may be transmitted to offspring begotten by a different father.*

Transmission of Disease.—The transmission of disease, from parent to offspring, presents a most interesting subject of inquiry to the practitioner of medicine. That this hereditary transmission is more or less constantly taking place, is a fact, unhappily, too well established, and it constitutes a veritable blight upon the race. Scrofula, syphilis, phthisis, carcinoma, etc., all of which I hold to be constitutional taints, may be transmitted either by the mother or father; and this will, of course, depend upon whether the former or latter be affected with the malady thus transmitted. For example, a scrofulous mother will pass the disease to her child, through the ovule which she furnishes—that very ovule being a part of her system—containing either the elements of health or disease, just precisely as the case may be. Again: all the soluble elements in the blood of the mother—salts, fibrin, etc.—pass freely into the blood of the fœtus. Suppose, again, the mother be free from all taints of scrofula, syphilis, etc., yet, under these circumstances, either of these affections may be propagated by the father, should he have the misfortune to labor under the affliction of either of them, or of any other constitutional malady capable of transmission; and it is propagated through the spermatozoa, which he emits during sexual intercourse, and which, as you know, are the true essential fecundating elements of the spermatic fluid.†

From what has been said of the placental circulation, it must be evident to you that when the blood of the pregnant female is im-

* Attention has lately been directed to a very curious class of phenomena, which show, that where the mother has previously borne offspring, the influence of the father may be impressed on her progeny afterward begotten by a different parent; as in the well-known case of the transmission of quagga marks to a succession of colts, both of whose parents were of the species horse, the mare having been once impregnated by a quagga male; and in the not unfrequent occurrence of a similar phenomenon in the human species, as when a widow who marries a second time, bears children strongly resembling her first husband. Some of these cases appear referable to the strong mental impression left by the first male parent upon the female: but there are others, which seem to render it more likely, that the blood of the female has imbibed from that of the fetus, through the placental circulation, some of the attributes which the latter has derived from its male parent; and that the female may communicate these, with those proper to herself, to the subsequent offspring of a different male parentage. This idea is borne out by a great number of important facts; and it serves to explain the circumstance well known to practitioners, that secondary syphilis will often appear in a female during gestation or after parturition, who has never had primary symptoms, while the father of the child shows no recent syphilitic disorder. For if he has communicated a syphilitic taint to the fœtus, the mother may become inoculated with it through her offspring, in the manner just described. [Carpenter's Human Physiology, p 781.]

† The reader will find some interesting facts touching the transmission of disease to the fetus, in an able Report on the Influence of Marriage and Consanguinity upon Offspring, by S. M. Bemiss, M.D., 1858.

pure, either from the accumulation in it of bile, or any other poisonous matter, the fœtus, which is nourished by that blood, must necessarily be exposed to more or less danger. There is another interesting feature connected with the condition of the blood during gestation, and it is this: It is not uncommon to find women, attacked with eclampsia or puerperal convulsions, bring forth dead children; sometimes when the child is not destroyed, it will itself have convulsions immediately after birth. I have seen several remarkable cases of this kind. With the doctrine that convulsions are oftentimes but the results of irritation upon the spinal cord, either through poisonous blood or some other influence, the explanation of the transmission of the convulsive movement to the fœtus is not difficult. The poisonous elements contained in the mother's blood are communicated to the embryo through the act of percolation, of which I have spoken; and these elements will produce, *cæteris paribus*, morbid effects in the latter, precisely similar to those observed in the system of the mother.

Change in the Circulation after Birth.—As soon as the child is born, and after its very first inspiration, the whole current of the circulation, as it previously existed, becomes suddenly changed. The blood no longer passes to the placenta; on the contrary, it is transmitted in large quantities from the right ventricle to the lungs, and these organs are then called upon to perform active and uninterrupted duty, viz. the decarbonization of the venous blood; in this way, it is converted into arterial blood, which, through the pulmonary veins, is conveyed to the left chambers of the heart, and distributed to the entire system, as has already been described. The consequence of this change in the route of the blood is the reduction of the ductus venosus and ductus arteriosus to mere ligamentous matter, while the foramen ovale becomes closed, and ceases to afford an opening for the transmission of blood from the right to the left auricles, as was the case during fœtal existence.

But, occasionally, it will occur that, through imperfect development or other circumstances, the foramen ovale does not become obliterated, and the consequence will be more or less imperfection in the circulatory function, giving rise, among other phenomena, to a disease, known as *puer cœruleus*, or blue disease, so called from the circumstance of the defective passage of the blood. Such a result, however, from imperfect closure of the foramen ovale, is not universal, for it has been shown by Dr. J. W. Ogle, and others, that in many adults the foramen still exists, without occasioning any trouble.

Does the Fœtus Breathe and Cry in Utero?—It is quite certain that the child cannot introduce air into its lungs if there be no air to be introduced; nor can it cry without the respiratory movement. Under ordinary circumstances, the fœtus is deprived of the

access of the atmosphere during its sojourn in utero, and, consequently, breathing and crying are out of the question. But there are some exceptional cases recorded on undoubted authority in which these phenomena have really been observed before birth, and they are explained in this way—the membranes having been torn, and the mouth of the child in communication with air, either in the vagina or at the neck of the womb, respiration and crying have ensued. It was the opinion of Geoffrey St. Hilaire that the fœtus absorbs air from the entire surface of its body, but a fundamental prerequisite for this theory is the presence of atmospheric air in utero.

LECTURE XIX.

Abortion—Its frequency—Loss occasioned by it to the Human Family—Dr. Whitehead's Statistics—The Various Divisions of Abortion—Viability of the Fœtus—The Case of Fortunio Liceti—At what Period of Gestation is a Female most likely to Abort?—The Opinion of Madame La Chapelle—Not sustained by general Facts—Abortion more frequent in the Primipara—Why?—Reflex Action—Whytt—Reid—Prochaska—Marshall Hall—Concentric and Eccentric Nervous Influence—What does it mean?—Eccentric Causes of Abortion—Hemorrhoids, Strangury, Tenesmus, Sea-bathing, etc.—How do they Produce Abortion?—Irritation of the Mammæ and Premature Action of the Uterus—Cause and Effect—How explained—Lactation, its influence on early Contractions of the Uterus—Centric Causes of Abortion—Anæmia and Abortion—Exsanguification and Convulsions—Experiments of Sir Charles Bell and Marshall Hall—Experiments and Deductions of Dr. E. Brown-Séquard—Mental Emotions, Syphilitic Taint, Death of the Fœtus, all Causes of Abortion—Disease of the Placenta and Abortion—Abortion sometimes the Result of Habit—Phenomena of Expulsion in Abortion—The Pain and Hemorrhage of Abortion—How distinguished—Treatment—How divided—The Application of Cold—Its Mode of Action in Arresting Hemorrhage—Tampon and Ergot—When to be Employed—Two-fold Action of Tampon.—Extracting Placenta in Abortion—Exhaustion from Hemorrhage—How Treated—Laudanum, its Efficacy in Exhaustion.

GENTLEMEN—I shall to-day speak of an interesting affection, one which should claim at your hands special attention, for the double reason that it is, in the first place, frequent; and, secondly, it is apt, under certain circumstances, to involve the female in more or less danger—I mean abortion. There is an additional interest surrounding this subject, and it will be found in the extraordinary waste of life it occasions through the destruction of fœtal existence. There can be no doubt that the loss to the human family from premature expulsion of the fecundated ovule is **very great**, and more particularly, when we take into account the numerous instances in which the loss cannot be positively ascertained; such, for example, as in very early pregnancy, when the discharge of blood attending the miscarriage is oftentimes judged to be nothing more than a late return of the menstrual flow.

Frequency of Abortion.—Dr. Whitehead,* in his work, gives, as the result of his observation in a certain number of cases, the following statistics:

In 2000 married women, in a state of pregnancy, admitted into

* Dr. Whitehead on Abortion and Sterility.

the Manchester Lying-in Hospital, he found their average age to be a fraction below 30 years. The sum of their pregnancies already terminated, was 8681, or 4.38 for each, of which rather less than one in seven had terminated abortively. But, as abortion occurs somewhat more frequently during the latter than in the first half of the child-bearing period, the real average will, consequently, be rather more than one in a dozen. Of these 2000 women, 1253 had not at the time of the inquiry suffered abortion. The average age of these was 28.62 years. The number of their pregnancies 3906, or 3.11 for each person. The remaining 747 had already aborted once, at least; some oftener. Their average age was 32.08 years. The sum of their pregnancies was 4775 or 6.37; that of their abortions, 1222, or 1.63 for each person.

From these statistics, it would appear that more than 37 out of 100 mothers abort before they attain the age of 30 years; but as 30 years may be considered comparatively young for the child-bearing woman, it is estimated that abortion occurs in nearly 90 per cent. of those females, who continue in matrimony until the final cessation of the catamenia. This is sufficient, gentlemen, to show you that abortion is by no means of rare occurrence; and the very circumstance of its frequency should impress upon you the importance, as well as the necessity, of thoroughly comprehending its nature and management.*

Divisions of Abortion.—You will find in the books various divisions of this subject; for example, one will tell you if the ovum be expelled from the uterus, prior to the third month, it is a miscarriage; if between the third, and end of the sixth month, it is an abortion; and between the seventh, and before the expiration of the ninth month, it is premature labor. Again: a recent author, Guillemot, divides the subject as follows: 1. Before the 20th day, he calls it ovular abortion; 2. If before the third month, embryonic; 3. From the third to the sixth month, foetal abortion. And so I might pursue the subject, arraying before you the multitude of divisions and subdivisions, not forgetting one of the most ancient of all, viz. if the ovule be expelled before the tenth day, it was denominated simply an effluxion. But we shall leave these refined minutiae for those who like them, and give you what we think to be more in accordance with practical observation.

We shall, therefore, consider the expulsion of the fecundated ovule from the uterus at any period from conception before the termination of the sixth month—an abortion, and from the seventh month, prior to the expiration of the ninth month, premature labor. This division is founded upon what I conceive to be a rational basis.

* In 41,699 deliveries, there were 530 premature births, or 1 in 78½. (Churchill, 4th London Edition, p. 167.)

It is now generally admitted that the fœtus is incapable of independent existence—in the event of its being thrown from the uterus—previous to the termination of the sixth month; so that the law of France on this subject, and I maintain that it is a just law—although it will, undoubtedly, oftentimes afford a mantle to conceal guilt—is, that a child born 180 days after wedlock, shall be considered not only viable, but legitimate, and entitled to all its legal and social rights. At the same time, it must be remarked, that, under peculiar circumstances of constitutional development, it is possible for a child born previous to this period to live, but the chance is so slight, that the law—wisely, I think—makes no recognition of it. I shall not enumerate the instances recorded by authors of extraordinary precocious viability—they do not carry with them that weight of testimony necessary to substantiate them as accepted truths. One of the most remarkable, however, may be briefly alluded to; it is the case of Fortunio Liceti, mentioned by Van Swieten. He was brought into the world before the sixth month in consequence of a fright his mother experienced at sea; when born, he was the size of a hand, and he was put into an oven by his father, for the purpose, no doubt, of making him *rise*. Fortunio, we are told, attained his seventy-ninth year.*

The period of Pregnancy at which Abortion is most frequent.
—There seems to be no little difference of opinion among writers as to the particular period of gestation at which the female is most likely to abort. A good observer, and a clever woman, Madame La Chapelle, announced, as the result of her experience in the Maternité of Paris, that abortions were more frequent at the sixth month than at any other time. Now, it must be recollected that Madame La Chapelle exercised a remarkable influence as a writer. Her statements were regarded with much favor, and, therefore, it can readily be conceived why it was that the opinion advanced by her on this question should have been so generally adopted by her contemporaries, and perpetuated by those who have succeeded her. It is not improbable that Madame La Chapelle was quite right, so far as the experience of the Maternité enabled her to decide

* October 10, 1842, I requested two of my pupils, Drs. Arendell and Morris, to attend during her labor Mrs. H., who was one of my clinic patients, and whom I had previously attended in three confinements. A few hours after the gentlemen reached her house, she was delivered of a female infant, which weighed two pounds nine ounces; the surface of its body was of a scarlet hue; and there was every indication of its being premature. It breathed, and in a short time after its birth cried freely. I ordered it to be wrapped in soft cotton well lubricated with warm sweet oil. It was nourished with the mother's milk, by having a few drops at a time put into its mouth. At first it labored under great difficulty in swallowing; but gradually it succeeded in taking sufficient to nourish it, and it is now a vigorous, healthy young woman. Independently of the evidence afforded by the physical appearance of this infant, I am satisfied, from other circumstances, that the mother could not have completed her sixth month of pregnancy.

this point. But that experience is not sufficient to establish the general fact, and for the obvious reason that women, in a state of pregnancy, are not, as a general rule, admitted into the Maternité in the earlier months of their gestation; so that while it may be true the records of that establishment do show that the period at which women most frequently abort is about the sixth month, yet these statistics, admitting their entire accuracy, are very far from proving the major proposition—that pregnant women are more liable to suffer abortion at the sixth month.

Indeed, all correct observation is, in my judgment, directly adverse to the fact; and I think the results of practice will very conclusively exhibit that, *ceteris paribus*, abortion is most frequent during the earlier months, say from the first to the third; and the reason for this is no doubt founded on the important circumstance that, at this early period, the attachments of the embryo to the uterine surface are comparatively so friable, that they are more liable to be broken up, thus ending in the premature expulsion of the product of conception. I also think that the primipara is more disposed to abortion than the female who has already borne several children. In the former, the uterus, for the first time becoming the seat of those rapid and extraordinary changes consequent upon impregnation, will be more likely to awaken, through reflex or other influences, irritation calculated to terminate in abortion; and this is particularly observed in two classes of patients, presenting two opposite conditions of system, viz., 1. In the excessively nervous; 2. In those characterized by unusual plethora.

Causes—Abortion sometimes occasioned by Reflex Movement.—The great fact that irritation of the spinal cord may be induced by the excitor nerves, had undoubtedly been demonstrated by Whytt, Redi, Prochaska, and others; but it must be conceded that, without the practical application made by Marshall Hall of this important physiological truth, its benefit to science would have been extremely restricted. To him, therefore, is due the merit of having faithfully and perseveringly insisted not only upon its value, but its indispensable necessity for the accurate diagnosis and treatment of disease. Previously to the discovery of reflex movement, it was supposed that all nervous aberrations producing irritation of the spinal cord, were *centric*, or in other words, the result of an influence applied directly to the cord; but now that the action of the incident excitor nerves is understood, we have another division of nervous disturbance, viz. *eccentric*, in which an irritation is produced on the peripheral or terminal extremity of one or more nerves; the impression thus made is conveyed by the nervous trunks to the spinal cord and the medulla oblongata by which, and without the interference of mind, an impulse is reflected back,

through the motor nerves, to certain muscles, and hence a movement is produced. This is physiologically—*reflex movement*.

I have purposely called your attention, incidentally at the present time, to this subject, in order that you may have a clear understanding of the true *modus operandi*, through reflex influence, of certain causes in the production of abortion. For example, it is not difficult to comprehend why it is that hemorrhoids, a collection of fecal matter in the rectum, irritation of the vagina, etc., will be likely to provoke early action of the uterus. Among the causes of abortion, from excito-motory influence, may also be mentioned excessive sexual intercourse in the newly married. A calculus in the bladder, or strangury produced by the absorption of cantharides from a blister, as also the tenesmus of dysentery, may be enumerated among the causes of abortion; all these influences act upon the same principle, by reflex movement, bringing into play the excito-motory system of nerves. I have known a lady miscarry from bathing in the ocean. Is it difficult to explain the relation of cause and effect between the cold bath and abortion? It is but another illustration of reflex influence. It is well known, as Marshall Hall observes, that cattle made suddenly to ford a creek, will, almost as soon as they feel the impression of the chilled water, evacuate both the bladder and rectum.

These, gentlemen, are important facts; and I might proceed to illustrate this great principle of reflex action as one of the causes more or less constantly at work in the production of abortion. Why is it that a piece of ice put into the vagina will often arrest fearful flooding? Why is it that titillating the mouth of the uterus with the finger will frequently arouse this organ from a state of inertia to one of positive contraction? In the operation of turning, soon after the hand has passed into the uterus, the accoucheur will experience the most painful sensation, this being the result simply of the firm grasp of the cervix uteri around his wrist.

You have had cases before you, in the clinic, of women, soon after parturition, experiencing severe pain in the uterus from the application of the infant to the breast. This is nothing more than another example of reflex influence; and so true is this connexion between the uterus and mammæ, that Scanzoni has recommended suction of the breasts for the purpose of bringing on contraction of the uterus in cases in which, from justifiable motives, it becomes desirable to induce premature delivery.

Lactation itself is an active, but, I think, not a sufficiently recognised cause of abortion; and it is important, therefore, for this as well as for other reasons, to direct a female, engaged in suckling her infant, who may suspect herself to be pregnant, to wean her child. This advice, if followed, will oftentimes insure her the

completion of her gestation. The well-known sympathy existing between the mammae and uterus will, I think, in part explain why a nursing woman is liable to abort; the traction of the child's mouth on the nipple being oftentimes an excitor of uterine action. Dr. Barnes* has written an able paper on this subject, and has shown that in a given number of instances, abortion occurred in 17 per cent. of cases in which the female became fecundated during lactation, and in only 10 per cent. when impregnation occurred at other times. Women will occasionally abort from the extraction of a tooth; in this case, the particular pair of nerves more immediately connected with this result is the fifth, or, as it is called, the trifacial. Diseases of the cervix uteri, such as ulceration, hypertrophy, induration, etc., also deserve to be ranked among the influences occasioning premature action of the uterus; and these, too, produce their effect upon the principle of reflex movement.

The important deduction I wish you to make from what has just been said in reference to this particular class of causes of abortion is, in all instances, to exercise a due degree of vigilance by endeavoring to ascertain in a given case the particular influence, which may be in operation at the time, and, by successfully removing it, render to your patient a substantial service, as far as may be.

Centric Causes of Abortion.—There is, however, another distinct class of causes, capable of inducing premature contraction of the uterus; and they differ from those already named in the important particular that they are centric, that is, their influence is exercised primarily on the medulla spinalis itself, and not secondarily, as is the case in the operation of the eccentric causes, which you know is through a reflected, and not a direct action. To illustrate: suppose a pregnant woman receives a blow on the spine, followed by abortion. Here, then, is an example of a centric cause, for the reason, that its primary influence is upon that great nervous centre—the medulla spinalis. A bloodless or anæmic condition of system is not an unusual cause of abortion; and this should explain to you why it is that women who have suffered excessive depletion, either from the lancet, or as the consequence of a long-continued drain, will be exposed to miscarriage. But you may desire to know what connection there is between abortion and anæmia. It has been shown that when an animal is bled to death its dissolution is preceded by convulsions. Sir Charles Bell and Marshall Hall both maintained that, in such cases, the convulsions are the result of loss of blood sustained by the spinal cord. It remained, however, for that eminent physiologist, Dr. E. Brown-Séquard,† to demonstrate by numerous experiments that the convulsions, in these cases,

* London Lancet for 1852.

† Experimental Researches applied to Physiology and Pathology. 1853. p. 117.

are not due to the anæmic condition of the cord, but to the increase of carbonic acid in the blood, which is proportionate to the insufficiency of the respiratory movement—the carbonic acid, under these circumstances, becomes an excitant to the cord, and is the true cause of the convulsions. The same observer has also shown that carbonic acid is an excitor of the muscular system, and, in this way, is to be explained the relation of cause and effect between a bloodless condition of the economy and contractions of the uterus.

Albuminuria in pregnant women is often the cause of abortion (Rayer, Martin, Solon, Cahen), of premature parturition (Rayer), or of the death of the child (Cahen). Braun says, in one-fourth of the cases of albuminuria during pregnancy, there is abortion or premature labor. Mental emotions, whether fright, anger, depression, sudden and excessive joy, etc., are all so many circumstances capable of giving rise to abortion; and the influence of these may be said to be through centric action.

Other Causes of Abortion.—A prominent and quite common cause of premature action of the gravid uterus, is a hyperæmic or plethoric condition. This organ may be congested, as a consequence of the general vascular state of the system; or it may be the result of some special local influence. For example: malposition of the uterus, or any other abnormal condition, inducing an obstruction to the free circulation of the blood; the abuse of emmenagogue medicines; inflammation, either of the external genitalia, or of the organ itself. The syphilitic taint and the abuse of mercury are also to be enumerated among the causes of abortion.

Syphilis may be transmitted from the mother to the child in utero; or, it may be derived from the father, through the fecundating liquor. In either case, abortion may occur in one of two ways. In the first place, from the death of the embryo; or, secondly, it may be occasioned by disease of the placenta, terminating in its early detachment, and consequent expulsion of the ovum. Small-pox may produce abortion, and in one or other of the modes just explained.

Death of the fœtus, no matter how produced, is to be regarded as one of the most certain of all the causes of abortion; and with a moment's thought you will perceive how fortunate this provision is; for the continued sojourn of the embryo in utero, after its death, would necessarily involve, through its decomposition, the safety of the mother, and hence the necessity for its early ejection.

You can readily understand the connection between abortion and disease of the placenta. This latter organ is called upon to perform a most necessary office; and even its partial separation cannot occur without exposing the embryo to serious hazard. The maladies to which the after-birth is liable are various; sometimes,

it will become indurated; at other times, it will pass to a state of hypertrophy or atrophy; occasionally, it will become the seat of calcareous formations, hydatid developments, unusual fatty degeneration, etc.; it may also be invaded by inflammation, or overwhelmed by an afflux of blood, constituting what has been so well described by Cruveilhier as *placental apoplexy*.

Habitual Abortion.—It is an interesting fact, that some women abort several times successively, and this is called the abortion of habit. A knowledge of this fact inculcates, in the first place, the necessity of the practitioner enjoining on his patient, in her first pregnancy, the great necessity of avoiding all those causes which are known to favor a premature expulsion of the ovum; and secondly, in the event of a miscarriage, to exercise more than ordinary vigilance in the subsequent pregnancies; and what I have found an excellent expedient in such cases is—as soon as gestation takes place, to interdict sexual intercourse until after the fifth month, for if the pregnancy pass beyond this period the chances of abortion will, I think, be much diminished.

These cases of habitual abortion are oftentimes exceedingly difficult to manage, simply for the reason that sufficient care is not exercised in ascertaining the true source of the difficulty. It is a fact, fully indorsed by all sound experience, that abortion is very apt to be followed by chronic affections of the uterine organs, such as displacements, or enlargements, and these are frequently the true cause of the early expulsion of the ovum. In such instances, the obvious indication is, through appropriate treatment, to remedy the displacement, and subdue the enlargement. If it be apparent, that the source of the trouble is plethora, the remedy will be the diminution of that state by judicious depletion, together with saline cathartics, and restricted diet; and here, if there be an absence of nausea—one of the ordinary and important phenomena of gestation—give tolerant doses of ipecacuanha, say from one-sixth to one-fourth of a grain every two or three hours, for the purpose of exciting action of the stomach. The reason for this latter treatment has been explained in a previous lecture. It is essential that the patients avoid all excitement, either mental or physical; and it is a rule with me to enjoin more or less quiet in the recumbent position until the expiration of the fifth month. I need scarcely remark that if the cause of the abortion be traced to excessive nervous irritability, this condition must be allayed by timely recourse to anti-spasmodics and anodynes; at the same time, the general health should be improved by tonics and appropriate diet. Dr. Tanner speaks highly, in these cases, of assafoetida.*

* One of the best agents with which I am acquainted in the troublesome cases of repeated miscarriage, occurring in weak and irritable women, in whom there is an absence of vascular congestion and any specific disease, is assafoetida. The dose

Whatever may be the particular cause of the abortion, the phenomena connected with the expulsion of the ovum resemble more or less closely those of an ordinary labor. The expulsive force is the same, viz., the contractions of the uterus. As a general rule, unless the membranes should be ruptured by the rude manipulations of the accoucheur, previously to the expiration of the third month the ovum is usually expelled entire with its envelopes.

Symptoms of Abortion.—They may be embraced in the two terms *pain* and *hemorrhage*. When a female is threatened with premature expulsion of the embryo, these two phenomena—pain and hemorrhage*—will almost always, to a greater or less extent, be present.

Diagnosis.—The diagnosis of a threatened abortion needs some little attention. In the first place, a pregnant woman may suppose herself menaced with abortion, simply because she has pain. But this is not sufficient—the pain of abortion, like the pain of labor, is peculiar—it is recurrent, paroxysmal, marked by distinct intervals, and *centring toward the loins and hypogastric region*. It is, in a word, nothing more than the contractions of the uterus, either masked or fully developed, and which, you know, are not continuous, but intermittent, when engaged in the expulsion of the ovum, whether at full term or at an earlier period. The pain, which the female may mistake for labor pain, may result from colic, indigestion, or various other circumstances, which have no possible connection with any specific action of the uterus. You see, therefore, it will be for you to determine as to the character of the pain, and whether it portend danger to the mother and embryo, or whether it be transitory, and will yield to the administration of appropriate remedies. So far, then, as either the pain or hemorrhage is concerned, it is incumbent to ascertain, in the first place, whether they really proceed from the uterus; and, secondly, if so, does the uterus contain an ovum, or, in other words, is the woman pregnant? The blood, although derived from the uterus, may not positively indicate an abortion, and so likewise with the pain, for both of these phenomena may exist without gestation. For example: they may be the result of a polypoid growth, of carcinoma, &c.; the bleeding and pain may be altogether unassociated with the uterus itself, and may proceed

which I usually administer is about five grains of the extract every night at bedtime, and I generally take care that the patient shall have had from three to five drachms before arriving at that period of her pregnancy at which she has formerly aborted. [Signs and Diseases of Pregnancy. By Thomas Hawkes Tanner, M.D., F.L.S., p. 257.]

* The bleeding in early gestation may arise from several circumstances—such as rupture of the vessels connecting the ovum to the uterus; or there may be a giving way of the serpentine vessels, which distribute themselves in the uterine walls, and which then pour their contents into the cavity of the organ.

exclusively from some abnormal condition of the vagina. The distinction can be arrived at only by a thorough examination.

Again: a pregnant woman, especially in the earlier months of her gestation, may have a discharge of blood through the vagina without being at all threatened with a miscarriage. This discharge may be nothing more than menstruation, which, you are aware, sometimes occurs in pregnancy, several examples of which you have seen in the clinic. As a general principle, you will be enabled to distinguish menstruation from the hemorrhage of miscarriage, as follows: 1. Its occurrence will usually accord with the menstrual periods previous to the pregnancy; 2. It is unconnected with any of the causes of miscarriage; 3. The patient is in good health; 4. The flow is not profuse, lasting generally but two or three days; 5. The pain in menstruation precedes the flow, and usually ceases as soon as the discharge occurs; 6. In miscarriage, whether before or immediately after its completion, the os uteri is more or less dilated and softened; such is not the case in menstruation.

Prognosis.—As a general rule, a favorable opinion may be expressed. The danger from losses of blood is much less in the earlier months, for the reason that the blood-vessels are less developed; it is rare to observe any serious puerperal complications follow an abortion—such as inflammation or fever.

Treatment of Abortion.—Let us now consider *how a miscarriage is to be managed*—a most important point both for the patient and practitioner. When summoned to a female, who supposes herself menaced with an abortion, the first and obvious duty of the accoucheur is to ascertain whether she be in fact menaced, or whether her fears are without foundation. This, of necessity, will involve a just discrimination of her condition—if she have pain, whether it be the offspring of uterine effort; and, if there be discharge of blood, whether it be the result of premature action of the organ. If it be discovered that the patient is really threatened, his duty will be confined to the attainment of one of two objects—either the prevention of the miscarriage; or, if this cannot be accomplished, he must limit himself to those measures, which will the most efficiently enable him to conduct his patient safely through her trouble.

With regard to the prevention of a threatened miscarriage, I wish very emphatically to remark that it can often be accomplished, even when apparently there no longer exists any hope of attaining this desirable object; and you must allow me to impress upon you, not only the necessity, but the high moral obligation imposed on the practitioner, of employing, in the most faithful manner, those means best calculated to arrest the early action of the uterus. It is proper, at this time, to examine in what these means consist. The prevention of a threatened miscarriage is not to be achieved

by any act of empiricism—it is, on the contrary, to be accomplished, in the first place, by a rigid appreciation of all the circumstances by which each individual case may be surrounded; and, secondly, by a proper adaptation of remedies to the peculiar condition of the system at the time.

We will now imagine you are at the bedside of a pregnant female, who has both pain and a discharge of blood from the vagina, and that you have satisfactorily ascertained, through a carefully instituted examination, that these two phenomena are positively connected with a threatened miscarriage—what is the first thing to be done? Certainly not, for the mere sake of appearing to do something, to be urged on to precipitate and unprofitable interference; but the judicious physician will take a survey of the condition of his patient, for the purpose of ascertaining some of the following points: Is she laboring under marked plethora? Is she of an extremely nervous temperament? Has she been exposed to any sudden emotion, such as fright, anger, or depression of spirits? Has she experienced violence from a blow or fall? Has she been subject to previous abortions? These are some of the principal inquiries, which a vigilant practitioner would naturally institute in his own mind.

You must remember that, in the management of a miscarriage, no matter what may be the cause which has determined it, *absolute rest must be enjoined*. This is a *sine quâ non* to the success of the remedies to which you will necessarily be obliged to resort. The patient should be placed in a recumbent position with her hips slightly elevated. Acidulated drinks, such as lemonade, may be given, or a capital compound under these circumstances will be the infusion of roses with dilute sulphuric acid, say $\text{f. } \frac{3}{4}$ viij. of the former to $\text{f. } \frac{3}{4}$ ij. of the latter—a tablespoonful every half hour. The room should be cool, and the covering light. The acetate of lead and opium may be resorted to, either in solution or pill, and oftentimes with much benefit, under either of the following formularies:

Acetat. plumbi, \mathcal{O} ij.
 Aquæ destillat. $\text{f. } \frac{3}{4}$ vj.
 Tinct. opii, $\text{f. } \frac{3}{4}$ ij.
 Ft. sol.

A tablespoonful every third hour.

Acetat. plumbi, gr. xxx.
 Pulv. opii, gr. iij.
 Divide in pil. xij.

One pill every two or three hours.

A most important adjuvant, under these circumstances, will be the application of cold, by means of cloths wrung out of ice-water,

and applied to the sacrum, around the loins, and to the vulva itself. Cold, remember, is the most powerful and efficient agent to produce directly and locally—and indirectly at a distance, by a reflex action—contraction of the blood-vessels. It excites contraction of the blood-vessels of the uterus much more readily than it affects the muscular tissue of that organ; in this way, it will arrest the hemorrhage, and also cause a diminution of the congestion, which is an excitant to uterine action. Another valuable remedy is belladonna. It is well known that it exercises a marked influence on the blood-vessels of the uterus, as upon those of the iris, intestines, etc., causing them to contract, and consequently relieving them of their congested condition. I have repeatedly had recourse to suppositories of the extract introduced either into the vagina or rectum—the latter is preferable, for the blood will be apt to remove the suppository from the vagina—and I can very confidently commend it to your attention, as oftentimes one of the most effectual means of arresting a menaced abortion.

Suppose, now, that your patient is plethoric, with more or less febrile excitement; what in this case should be done, especially if there be a hope of preventing the expulsion of the ovum? Why, obviously to reduce the plethora, which you will find not an uncommon predisposing cause of abortion. For this purpose, general blood-letting is the great agent. I much prefer it, under these circumstances, to local depletion. The quantity to be taken must depend upon the sound judgment of the practitioner. Two, four, six, or nine ounces may be abstracted, and repeated as events may suggest. It is well to bear in mind that, in these cases, the drawing of blood is not for the purpose of combating an active inflammation seated in an important organ, but the object is simply to diminish the momentum, if I may so term it, of the circulation, and thus protect the uterus from the afflux setting toward it. In addition to the abstraction of blood, give ten grains of nitrat. potasse in a tumbler of water, with *vj.* gtt. of tinct. digitalis. Let this be repeated every four or six hours, together with *abstemious diet*.

It may, however, be that your patient is not laboring under plethora, but she is of an extremely nervous temperament. What in this case is indicated? Certainly not the abstraction of blood, for this would only tend to aggravate the nervous irritability; but on the contrary, the employment of such remedies as will calm and fortify the system, such as the various antispasmodics, nervines, etc. In these instances, I have experienced much benefit from the injection into the rectum of thirty drops of laudanum to a wine-glass and a half of water; lubricating the os tincæ and vagina with the ungt. belladon. (*3j.* extract belladon. to *3j* of adeps), and the introduction of opium suppositories into the

rectum. Internally, a table-spoonful of the following mixture may be given every half hour, until the object be attained :

Syrup. papav. f. 3 iv.

Mucil. acac. f. 3 iij.

Sol. sulph. morphinæ (Majendie) gtt. xx.

Ft. mist.

In all cases of threatened abortion, the attention of the practitioner should invariably be directed to the condition of the rectum; for it will not unfrequently happen that a collection of fecal matter in this intestine is the starting point—the original exciting cause of the difficulty. If this should be so, the first thing to be done is to evacuate the bowels by means of an enema. It may, on the contrary, be that the patient is affected with hemorrhoids. If these be external, they should be carefully introduced within the rectum so that they may be relieved from the constriction of the external sphincter. The removal of the hemorrhoidal tumors, under the circumstances, cannot for a moment be thought of, for the operation itself would almost certainly provoke the contraction of the uterus.

As I have mentioned to you, in a preceding lecture, the pregnant female is to be sedulously guarded against torpor of the bowels, and this direction, too, is especially applicable in cases of threatened abortion. Epsom salts in small quantity, a seidlitz powder, manna, the compound rhubarb pill, are all well adapted to this end.

Allow me to make one remark in reference to the impregnated uterus in the case of the *primipara*. You will find, as a general rule, that women of an excessively nervous temperament, who may, in fact, be termed very *impressionable*, are more apt than others to miscarry in their first gestation, and the circumstance is readily explained. In *primiparæ*, the uterus distends with less facility than in subsequent pregnancies; and in women of great nervous susceptibility, the very difficulty encountered in the distension of the organ, frequently tends to premature action of the uterus, and the expulsion of the ovum. In such cases, even before the slightest manifestation of trouble, I have been in the habit of recommending to foment freely, but without using friction, the hypogastric region with warm sweet oil and laudanum. This, I am sure, will often prove an efficient remedy in these instances, and I can speak of it, from no limited success, with much confidence.

But let us present to you another view of miscarriage. The treatment which we have thus very summarily suggested, is intended for the prevention of this trouble, when it is merely threatened. I shall now call your attention, for a moment, to those remedies indicated in cases in which it becomes impossible to arrest the

expulsion of the ovum, and in which, therefore, the duty of the practitioner will be limited to saving the life of the mother.

The true danger to the mother in abortion is the fearful hemorrhage, and examples are not few in which she has sunk from loss of blood. When, then, it becomes an ascertained fact that the miscarriage cannot be controlled, the obvious duty of the practitioner is to promote, by judicious interposition, the termination of the delivery; and you are also to bear in mind, whenever the hemorrhage is such as to endanger the safety of the mother, all regard for the embryo must be suspended; no matter what may be the possible or probable chances of arresting the miscarriage, every consideration must yield to the higher claim of the parent. It is an extremely nice point always to determine when the hemorrhage is so profuse as to render it essential to induce the expulsion of the ovum, and, also, when it is certain that the abortion cannot be prevented. In some instances, it is true, this question may be decided without trouble; when, for example, a portion of the ovum—which will sometimes happen—has been thrown off; and, again, if the ovum be distinctly felt protruding through the dilated os, it is unequivocal evidence that its expulsion cannot be controlled. As to the question of the amount of hemorrhage which will not only justify, but absolutely call for the prompt action of the accoucheur to promote the evacuation of the contents of the uterus—this, I repeat, is a question of judgment to be determined by the evidence which may present itself at the time. Permit me, however, to make a single remark on this point. *I have known women to lose immense quantities of blood in a threatened abortion, and to be apparently moribund from exsanguification, and yet they have rallied, and gone on to the full term.* These latter examples, however, are exceptions to the general rule.

Well, when there is no longer any hope of restraining the abortion, or when the woman is flooding so profusely as to endanger her life, the mouth of the uterus will be in one of two conditions—it will be either sufficiently dilated to enable you to feel the ovum, or it will not be so dilated; and again, the ovum will also be in one of two conditions: it will either have partially extruded through the cervix, or it will still be within the cavity of the uterus. Now, let us examine each of these points. 1. Should the uterus be so far dilated as to permit the introduction of the finger, I should recommend you, by all means, gently to increase the dilatation—and this is readily accomplished by pressing the finger alternately forward and backward—this very motion of the finger evokes a strong reflex action, which oftentimes results in the prompt expulsion of the ovum. 2. If the os uteri have not undergone dilatation, and the hemorrhage so profuse as to occasion alarm for the mother, then the remedies to be employed are the follow-

ing: 1. Cold; 2. The tampon; 3. The *secale cornutum*. Here, you perceive, the object is to bring on, as speedily and efficiently as possible, contractions of the uterus, for it is on the efficient contractions of this organ that you are to rely for the arrest of the hemorrhage. I have told you that, when a miscarriage is merely threatened, and, therefore, it becomes the duty of the medical man to do all in his power to prevent it, the application of cold by means of cloths to the vulva, sacrum, and loins, is of great benefit, because of the contraction it produces in the blood-vessels of the uterus. There is now, however, profuse hemorrhage, placing in more or less peril the safety of the woman; and here, too, cold, properly resorted to, will prove one of the most positive remedies. If you dash cold water—it would be better if it were iced—upon the abdomen, you will oftentimes, in these cases, cause a prompt action of the uterus; or a small piece of ice introduced into the vagina, will occasionally act like magic. In either instance, the uterus is made to contract in consequence of reflex action.

The tampon is a valuable agent in this form of hemorrhage. It should consist of small pieces of fine sponge, or lint, which should be carefully introduced into the vagina, as far as the os uteri, until the passage is completely filled up. The whole is then to be kept in place by a compress and bandage. It may happen that the pressure of the tampon against the urethra, or neck of the bladder, will prevent the flow of urine; in this case, the catheter must be used. I would advise you not to allow the tampon to remain, at any one time, in the vagina for a longer period than four hours; it should be withdrawn at the end of this time, and replaced, if found necessary, by another; this is an important direction, for the long-continued use of the same one will be apt to occasion putrefaction of the fluids which necessarily, to a greater or less extent, saturate it. The tampon acts, if I may so say, in a two-fold capacity. In the first place, it arrests, for the time being, the hemorrhage; and, secondly, the irritation produced by it on the mouth of the uterus provokes contractions of the organ, and thereby facilitates the object in view.

Another efficient remedy in these cases is ergot—the *secale cornutum*; and it is efficient because of its action on both the blood-vessels and muscular tissue of the uterus. It is now admitted that this drug affects the vessels and muscular fibres of the organ on precisely the same principle; it acts upon the smooth fibres of the uterus: it acts also on the smooth fibres of the blood-vessels. It, therefore, is true that ergot arrests uterine hemorrhage in a two-fold manner: 1. By producing contraction of the blood-vessels; 2. Contraction of the muscular structure of the organ. Ergot is not a stimulant of any portion of the nervous system, and may, therefore, be regarded the antagonist of strychnine.

I should not hesitate an instant, in any urgent case where the strength of the mother is giving way from the loss of blood, and the mouth of the uterus still undilated, to introduce with my index finger as a guide, a female catheter or bougie—I prefer the former—into the os uteri, and thus hasten the dilatation by promoting efficient contractions.

Let us now suppose the ovum is partly protruding through the os uteri: in this case the proper practice is to terminate without delay its expulsion, by introducing the finger, and making gentle tractions upon it. If, on the contrary, the ovum be still within the uterine cavity, and it be desirable, on account of the hemorrhage, to hasten its delivery, then the means already mentioned—cold, tampon, and the ergot—will be indicated; and what you will find a capital means in addition, for the purpose of promoting strong uterine effort, will be a drastic cathartic—say for example, a couple of aloetic and myrrh pills—or from one to two ounces of the compound tincture of aloes; or if the case be urgent, requiring prompt contractions of the organ, a drastic enema may be administered.

If abortion should occur before the expiration of the first three months of gestation, and the ovum come away piecemeal, the placenta will sometimes be retained, giving rise to much uneasiness on the part of the patient, and causing no little embarrassment to the young practitioner. These are the cases in which various contrivances have been projected for the purpose of extracting the retained mass—such as the tenaculum, the small slender forceps, hooks, etc. These instruments are, in my judgment, not only unnecessary but fraught with danger. The best extractor is the finger. Let it be carefully introduced within the cavity of the uterus, and by skilful manipulation, with the other hand placed upon the abdomen depressing the fundus of the womb, the remaining portion of the ovum can, generally, without difficulty be removed. At a later period the uterus will be large enough to admit the introduction of the hand, and in this way the after-birth may be extracted. It is a curious and interesting fact that the retained placenta in cases of abortion does not, as at the full period of gestation, undergo decomposition, and, therefore, if it cannot be readily secured, should cause no disquietude. It will often pass off spontaneously, even after all efforts to remove it have proved unavailing.

The patient, after an abortion, should, as in an ordinary labor at term, be kept quiet, and preserve the recumbent position. Her diet should be light, the bowels soluble, and all excitement avoided.

In the event of alarming prostration from loss of blood, there is no remedy more efficient in bringing on reaction than tea-spoonful doses of laudanum and brandy in a wineglass of strong coffee, every ten, twenty, or thirty minutes, according to the requirements of the case. Be not afraid of this remedy, it is the sheet-anchor

of hope in cases in which the patient is almost sinking from exhaustion consequent upon profuse hemorrhage. But, of all things to be remembered, see that the uterus is well contracted, and not in a state of inertia, for it would be the essence of folly to attempt to control the exhaustion while the waste gate is still open. In abortion, as in delivery at full term, flooding is always one of the results of inertia of the uterus.

In all cases of abortion, an important direction for you to bear in mind, is to examine carefully any clot or substance which may be thrown off from the uterus; and this rule should be observed from the very commencement of the discharge. The object of the examination is to be assured whether the embryo has been expelled; and this necessarily suggests the discussion of the question of moles, or, if you prefer it, molar pregnancy, to which subject the succeeding lecture will be devoted. In conclusion, I would remind you that you will sometimes meet with cases in which there is more or less oozing of blood after the entire expulsion of the ovum; and this will ordinarily occur in women of a leuco-phlegmatic temperament, with a flaccid, muscular fibre; the hemorrhage in these instances is almost always of a passive type, constituting what may be termed passive or atonic metrorrhagia. When called upon to treat a case of this kind, you will recognise great benefit from the injection, night and morning, into the rectum of a half pint of water, cold from the pump, together with the internal administration three times a day, as may be indicated, of f. 3 j. of the tincture of ergot in half a wineglass of cold water.

LECTURE XX.

Moles—Importance of the Subject—Moles variously Classified—Mauriceau's Definition—The Opinion of Fernel—Practical Division of Moles—The True Mole always a Proof of Previous Gestation—Distinction between True and False Mole first made by Cruveilhier—Mettenheimer and Paget on True Mole—Dr. Graily Hewitt—Case in Illustration of a True Mole—Can a Married Woman, if separated from her Husband since the Birth of her Child, or can a Widow, Discharge a True Mole from the Uterus consistently with her Fidelity?—False Moles, what are they?—Substances expelled from the Womb of the Young Virgin—Fibrinous Clots—The Membrane of Congestive Dysmenorrhœa—The Hen lays an Egg without the Tread of the Cock—Does the Membrana Decidua pass off at each Menstrual Period, or is it simply the Epithelial Covering?—The Testimony of Lamswerde, Ruysch, and Van Swieten as to the False Mole—The True Hydatids—Can they be produced in the Virgin Uterus?—The Case cited by Rokitsky—Importance of the Question—How are the True Hydatids to be distinguished from the Hydatiform Vesicle?

GENTLEMEN—In the course of your practice you will observe, more or less frequently, examples of anomalous substances thrown from the uterus, and this, too, both in the married and unmarried; hence you at once perceive how much will necessarily depend upon the sound judgment of the physician in order that character may not be unjustly assailed, or wantonly destroyed. These substances have been differently named and classified; and there has existed no little discrepancy of opinion as to the particular cause of their origin.

In a question so vitally important as is the one now before us, it appears to me there is great want of accuracy in the arrangement and description, which the older authors have given of the various matters discharged from the womb; and this want of definite arrangement will, I think, account for the marked conflict of opinion entertained as to the true source of these expelled masses. One of the great masters of obstetric science is constantly quoted in proof of the alleged fact, that when a female expels from her uterus a substance—known under the vague name of mole—she could only have done so in consequence of intercourse with the other sex. I allude to the learned Mauriceau, who, in one of his aphorisms,* says, “*Les femmes n’engendrent jamais des moles, si elles n’ont usé du coït.*” In order to prove the fallacy of this apho-

* *Traité des Maladies des Femmes Grosses.* Aphorism, 105.

rism, and consequently the wrong of its adoption, I have had the curiosity to examine for myself the actual definition which this distinguished man has given of a mole. I find the following to be his language: "La mole n'est autre chose qu'une masse charnue sans os, sans articulations, et sans distinctions des membres, engendré contre nature dans la matrice ensuite du coit, des semences corrompues de l'homme et de la femme."* Here, then, according to this definition, a mole is simply a fleshy mass, bearing none of the evidences of the product of a previous conception; and, therefore, with this restricted signification, we are called upon to pronounce all such substances as unqualified evidence of sexual intercourse—a theory at once cruel and unjust, as we hope to demonstrate before completing this lecture.

Another high authority, the celebrated Fernel, physician to Henry II., originated the following maxim, which is also frequently referred to in confirmation of the opinion subsequently advanced by Mauriceau: "Nusquam visa est mulier molam sine mare concepisse."† I might, indeed, cite many other authorities in confirmation of the same view, but this is not necessary. I prefer rather, in the face of such testimony, to urge the absolute duty imposed upon you of examining most scrupulously the grounds for this sweeping declaration, and of repudiating its adoption, unless convinced by positive proof of its truth. The opinion bears too directly upon character and the best interests of society to receive a tacit concurrence, and, therefore, become a principle of guidance in cases in which a decision is to be arrived at, involving the important question of chastity or infidelity, either in the married or unmarried. What I object to in the authors just cited is their want of precision in the definition of what a mole really is; for assuredly, in order that we may have a correct judgment as to the true origin of these expelled substances, we should first have some standard of comparison, which science recognises, as the only means by which we are to distinguish between what is and what is not a mole—the offspring of a previous conception, or, if you please, a blighted ovum.

Therefore, for practical purposes, the substances expelled from the uterus may be divided into two distinct orders or classes: 1. Those, which are the product of a diseased or degenerated ovum, and consequently implies a previous fecundation—known as *true moles*. 2. Those the origin of which has no sort of connexion with sexual intercourse, but which is due to causes altogether foreign to this influence, known as *false moles*.

The True Moles—Vesicular or Hydatiform Moles.—It has been very satisfactorily demonstrated by Charles Robin, and others, that an alteration in the envelopes of the ovum, with an anomalous

* Tome i. p. 599

† Fernel, tome i. p. 599.

enlargement of the chorial villousities, is the only origin of a true mole, thus essentially connecting the source of this character of mole with a previous conception. The hydatiform* or vesicular mole has recently occupied much attention. Cruveilhier, it is now generally admitted, was the first clearly to point out the absolute difference between the vesicular or hydatiform mole, and what is understood, in pathological language, as the true hydatids, which are occasionally found in the heart, liver, spleen, and other organs. Whether, under any circumstances, these true hydatids, the origin of which is of course unconnected with pregnancy, can exist in the uterus, we shall examine in the course of this lecture.

Various theories have been advanced to explain the special changes the chorial villi undergo preliminary to their transformation into the hydatiform bodies. It is supposed by Mettenheimer and Paget that the change consists essentially in the conversion of certain of the cells in the villi of the chorion into so many cysts; on the outer surface of these new-formed cysts, a new vegetation of villi sprouts out, being identical in structure with the proper villi of the chorion; and in these last villi there commences a new development of cysts, and so on *ad infinitum*. The opinion of Paget and Mettenheimer is opposed in a recent paper by Dr. Graily Hewitt,† who maintains that, in the hydatiform mole, there is not a new formation, but simply an alteration and degeneration of previously existing structures. This writer also dissents from the opinion, now generally admitted, that the starting-point or cause of the transformation is disease of the chorion, while the effect is the destruction of the embryo. Dr. Hewitt, on the contrary, endeavors to show that the degeneration is the result of the death of the fœtus. His paper embodies much interest, and will amply repay perusal. Dr. Barnes‡ has presented an elaborate *résumé* of the whole question with his accustomed ability, and the reader will find much of profit in his valuable contribution.

You were told, when speaking of reproduction and pregnancy, that certain phenomena are absolutely essential to the formation and ultimate development of the embryo; these phenomena have already been pointed out in detail. The moment the act of fecundation has been consummated, then the work of growth and deve-

* The hydatiform mole is usually thrown off before the completion of the ordinary term of pregnancy. If not ruptured during its expulsion, the mole will be found to exhibit a cavity full of a serous liquid, in which are never observed the small granular bodies (echinococci) first described, I believe, by Rudolphy, and which always exist in true hydatids or acephalo-cysts. Should the mole be expelled soon after the death of the young embryo, portions of the latter may be detected in its cavity; but if it pass off long after its destruction, then the mole assumes more or less the aspect of the placenta, and there remains but little of the cavity.

† Obstetrical Transactions. London, vol. i., 1860, p. 249.

‡ Brit. and For. Medico-Chirurgical Review, 1854-5.

lopment commences—these two latter phenomena being the results of a healthy nutrition. It will, however, sometimes happen that, after the vitalized germ is deposited within the uterine cavity, some morbid influence may arise in the germ itself, which will compromise the progress of a normal gestation, and lead to the destruction and degeneration of the ovum; so that, in lieu of fœtal development, the product of conception exhibits a more or less anomalous mass, in which, with a due degree of care, there will be recognised the alterations of the chorial villousities, if not with the naked eye, at least under the power of the microscope—and *this, remember, is the conclusive affirmative proof of the true mole*. In other instances, and they are not rare, the fœtus may be expelled normal and fully developed, while the placenta will exhibit a partial hydatiform degeneration in its villousities.

It is an interesting fact to bear in memory, that, as a general rule, soon after the death or metamorphosis of the ovum, the uterus becomes intolerant of its presence, and expels it. This result, however, is not universal; the exceptions are not few, and the degenerated ovum will occasionally remain for a long time in the uterine cavity. The latter circumstance may involve character in one of two ways—for instance, a lady may bring forth a healthy living child at full term; in three, six, or twelve months subsequently she may have expelled from the womb a true mole. This may occur in a case in which the husband has been absent during the whole period from the birth of the child until the expulsion of the mole. Again: the same circumstances may be observed in a widow, some considerable time after the decease of her husband.

In instances like these, what is to protect the fair fame of the parties but the testimony of the medical man that such occurrences may be entirely consistent with individual purity? In order to illustrate this point, let us suppose, in the former instance, that the female is pregnant with twins: in an early part of the gestation one of the germs dies, and the other reaches its full term of development. The germ which survived for so short a period is transformed into a degenerate mass, and continues in the uterus for some months after the birth of the living child. In the second case, the female becomes impregnated before the demise of her husband, but the germ, instead of progressing through its various phases of development, from some cause or other becomes changed into a molar body, and may continue its sojourn within the uterus for months after the widowhood of the female. When, therefore, I tell you that such contingencies have occurred, is it not important that we should be somewhat reserved in the expression of a prejudicial opinion in either of these citations, without some broader foundation than the isolated circumstance—that a mole has been expelled?

Without yielding the slightest endorsement to the fanciful pictures drawn by some authors of the striking resemblance between uterine moles and certain animals, such as lizards, screech-owls, monkeys, frogs, etc., yet it is well to remember that the mole is not of a uniform aspect, but will assume a variety of shapes and figures, and still exhibit all the evidences of a true mole.

The following interesting case, in which I performed, almost *in extremis*, an important operation, may not be without instruction, as having a bearing on the question now under consideration :

On Wednesday, April 7, 1849, Mr. D. requested me to pay a professional visit to his wife. She had been attended for several weeks by two medical gentlemen who, on the day before I saw her, had voluntarily withdrawn their attendance under the conviction that her case was without remedy, and with the opinion fully expressed to Mrs. D. and her friends that, in all probability, she would survive but a few hours. Her husband, in his interview with me remarked, that he was without the slightest hope, he and his friends having watched with the suffering patient the two previous nights, expecting her death at any moment. With such a representation of the case, I frankly told him I thought a visit from me useless, but if it would afford him any gratification I would cheerfully accompany him. He repeated his desire that I should see his wife. On being introduced into her chamber, I found her lying on her back, her face pale and emaciated, with every indication of extreme prostration; the expression of her countenance also gave evidence of great suffering. Her pulse was thready, and beat one hundred and twenty to the minute. Such was her exhaustion that when I addressed a question to her it became necessary for me to place my ear to her lips to distinguish her answer, and even then the articulation was almost inaudible; in one word, the appearance of the patient was that of a dying woman. Her respiration was labored, and the abdomen as much distended as is usual at the ninth month of gestation.

On percussing the abdomen, I distinctly recognised fluctuation; in attempting to introduce my finger into the vagina, with a view, if possible, of ascertaining the character of the enlargement, I felt, at the opening of the vulva, a soft, elastic tumor, projecting through the mouth of the womb, which was dilated to the size of a dollar piece. The parietes of the os uteri thus dilated were extremely attenuated, and did not appear to be thicker than common writing-paper. I found no difficulty in introducing my finger between the tumor and internal surface of the cervix, the adhesion being so delicate as to yield to the slightest effort. I satisfied myself that there was no action in the womb; the patient had not experienced anything like labor pains, and the dilatation of the cervix was the result merely of mechanical pressure produced by the tumor within

the uterus. While pressing gently with my finger on the tumor, as it presented at the mouth of the womb, and grasping with the other hand, the abdominal enlargement, I could a second time distinctly feel fluctuation. Again: in placing my finger on the outer portion of the posterior lip of the uterus, and seizing with the other hand the upper surface of the tumor through the abdominal walls, alternately elevating and depressing the two hands, it was evident that I embraced the womb itself, which was immensely distended by the growth of the tumor. In making an examination, *per rectum*, the enlarged uterus was detected without difficulty.

These circumstances, together with the important fact, that the abdominal enlargement was uniform on its surface, possessing nothing of the features usually attending extra-uterine growths, such as ovarian and fibrous tumors, caused me to arrive at the conclusion that, in the present case, the tumor was exclusively *intra-uterine*. It will be perceived that, on this decision, depended the remote hope of giving to the suffering and almost dying patient even temporary relief from her agony. Having, therefore, formed my judgment as to the seat of the tumor, and partially as to its nature, I stated to the husband that, desperate as the case was, and imminently perilous as would of necessity be any attempt to remove the tumor in the exhausted and nearly hopeless situation of his wife, yet, it was my opinion that it could be removed, although the *serious hazard was, that the patient would sink under the operation*.

This opinion was given emphatically, without reserve, and unaccompanied by a word of comment, calculated to urge consent to an operation, which presented but little prospect of permanent relief, and could only be justified by the reasonable expectation that, if the patient should survive the removal of the tumor, her sufferings would be mitigated, and her progress to the grave rendered comparatively comfortable. The opinion was communicated to the patient by her husband, and she expressed an unqualified desire that the operation should be performed without delay, remarking that she was prepared to encounter everything, even death itself, with the remote hope of temporary relief from the agony occasioned by the pressure of the tumor. The husband and friends acquiescing in this appeal of the unhappy patient, I left the house for the necessary instruments, promising to return in half an hour and perform the operation. On my return, I was accompanied by Dr. Detmold and two of my pupils, Messrs. Woodcock and Burgess. These gentlemen heard with me the following particulars of the case, as related by the husband and sister of the patient:

Mrs. D. was forty-seven years of age, and married in 1832. Soon after her marriage she was attacked with cholera; during her convalescence from this disease, she miscarried. Her health had been

more or less infirm for the last ten years. Her menstrual periods had always been regular, with the exception of the last year, during which time they occurred once in two or three months, and then not freely. This she imputed to *change of life*, and the circumstance did not attract any special attention. Her abdomen had begun to enlarge in July, 1849, and continued to do so to the present time. In January last, she suffered greatly from distension of the bladder, and could not void her urine except in small quantities, accompanied by excessive pain. For this she consulted a medical man, who found it necessary to introduce the catheter, from time to time, to relieve the bladder. She commenced as early as January to be constipated, and defecation was attended with excruciating suffering. These difficulties about the bladder and bowels continued to increase, and for weeks before I saw her, she repeatedly passed over ten days without an evacuation—medicines having no effect, and injections, per rectum, immediately returning without bringing away any fecal matter. Her urine was voided in very small quantities, not more than two tablespoonfuls at a time, and it was nearly the color of blood. It was impossible for her to evacuate the bladder, except when resting on her elbows and knees; this position, however, occasioned so much fatigue, that, in her present exhausted condition, she could not avail herself of it. In a word, the agony of this unhappy sufferer was induced almost entirely by the pain consequent upon the attempt to evacuate either the bladder or rectum.

With these facts before me, together with a knowledge of the position and bearings of the tumor, it was not difficult to arrive at the important conclusion that the pain and distress in the bladder and rectum were due to *mechanical pressure of the intra-uterine growth*. At my request, Dr. Detmold examined the patient, and, in view of all the circumstances of the case, concurred with me in opinion that, *without an operation she could survive but a few hours; while if she did not sink under the attempt to remove the tumor, her distress would be sensibly palliated, and her life possibly prolonged*.

With the understanding, therefore, of the uncertainty and immediate danger of the operation—an understanding fully appreciated by the patient and her friends, I proceeded to remove the tumor in the following manner:

A mattress was arranged on a table, and Mrs. D. placed on her back, her hips being brought to the edge of the mattress, the thighs flexed on the pelvis, and an assistant on either side to support the feet and limbs. I then introduced the index finger of the right hand into the womb, steadying the tumor with the other hand applied to the abdomen, and succeeded in directing my finger its full length between the tumor and cervix of the uterus; this

was done with great caution, for the parietes of the cervix were so extremely thin, that indiscreet manipulations would almost certainly have produced rupture of the organ. With a view, therefore, of obviating such a result, I thought it more desirable to break up the adhesions of the tumor simply with the finger than incur the hazard of introducing instruments into the uterine cavity. In proportion as the adhesions yielded, I grasped the tumor, and without much effort was enabled to remove it with my hand in fragments. Having brought away in this manner all the solid portions, and carrying my hand well into the cavity of the womb, I distinctly felt a sac pressing, as it were, against my finger. I immediately ruptured this, and there escaped, by measurement, three quarts of fluid which resembled in all its physical qualities, with the exception of the smell, pure pus. This fluid was collected in a vase as it passed from the womb, and half an hour afterward on examining it, we found it no longer liquid, but presenting a solid mass, pearly, like hardened lard. It was evident, therefore, that the temperature of the body kept this substance in a fluid state. As soon as the fluid had escaped, I introduced my hand still higher, and felt something in touch resembling human hair. It was, in fact, *a mass of human hair matted together*, with no other vestige of an embryo—there was no trace of scalp or anything else save the hair. I grasped this body, and removed it from the womb entire, it being so compact as not to separate in fragments.

The uterus, thus freed of its contents, contracted, and there was no loss of blood. After the solid parts of the tumor had been extracted, there escaped from the bladder an incredible quantity of high-colored urine, which gave such relief to the patient that it caused her to exclaim, in simple, yet emphatic language, "Doctor, I am in Heaven!" It may here be asked why the catheter had not been introduced before commencing the operation. In answer to this very proper question, I would merely remark that every legitimate attempt had been made to effect this desirable object, but it was found physically impossible—without inflicting serious injury on the patient—from the pressure of the tumor on the neck of this organ.

Mrs. D. bore the operation with a heroism which greatly surprised us; and although it became necessary to suspend all manipulations, to rally her from fainting, which occurred three different times, yet, considering her extreme prostration, it may well be deemed a matter of amazement that she did not sink. The operation being completed, the patient was placed comfortably in her bed. In the course of half an hour, her breathing became easy, the pulse fell ten beats in the minute, and there was an expression of composure about her countenance, which gave sincere joy to all of us, feeling, as we did, an intense and unaffected anxiety as to the immediate

issue of the case. Without the aid of an anodyne, she fell into a sleep which lasted six hours, the first repose she had enjoyed for many long nights of agony.

When she awoke, she appeared greatly refreshed, and, although extremely prostrate, seemed to take pleasure in gazing on her friends, to each of whom she gave a look of recognition. In the morning after the operation, her bowels were spontaneously and freely moved, a large quantity of hard fecal matter passing away. Subsequently, injections, simply of warm water, sufficed to afford her a daily evacuation, and the urine was discharged freely and without obstruction. Mrs. D. continued to improve in appetite, digestion, and strength; and, although her friends were admonished not to be too sanguine as to her recovery, yet they regarded the fear of any other issue as utterly groundless. On the 22d of April, fifteen days after the operation, she began to fail, and in defiance of everything which could be brought to bear in her case, she continued to sink, and expired on the 25th of April, having survived the operation eighteen days.

I have no doubt the anomalous mass found in the womb of this patient was the product of a *blighted ovum*, and it may be reasonably asked whether her chances of recovery would not have been greatly enhanced if the tumor had been removed at an earlier period, before the powers of the system had become exhausted by long-continued and uninterrupted suffering. The adhesions, it will be remembered, of the shapeless mass to the internal surface of the womb were slight.

The stearine, which escaped after the sac was ruptured, I regard as nothing more than the fœtal brain, and other fatty portions of the system, in solution. These circumstances, together with the quantity of human hair removed from the uterus, and the fact that the tumor was comparatively of rapid growth, are, in my judgment, conclusive proof of previous conception.

False Moles—Molæ Spuriæ.—These will embrace all the substances formed in the uterus, in no way connected with impregnation—such as polypoid and fibrous growths, blood clots, the membrane of congestive dysmenorrhœa, and, perhaps, the true uterine hydatids denominated acephalocysts. It may be mentioned here that the mucous polypus has often been confounded with the mole due to a previous fecundation.

Young girls will sometimes, after extreme local suffering, expel substances more or less solid from the uterus; in cases like these, the medical man cannot be too much on his guard—a shade of doubt expressed by him will immediately be interpreted adversely to character; and rumor, with her thousand wings, will soon consign to infamy the purest and most spotless. Remember, gentlemen, that the young girl who has become the object of suspicion is

worse than the withered flower—nay, she is the upas of society—her very presence is avoided, for the reason that social contact with her begets, as it were, an atmosphere of pestilence, destructive alike to all who breathe it! A man may be suspected of forgery, and yet, by a chain of irresistible evidence, he may prove his innocence, and become restored to society. So may one of you be charged with the high crime of murder, and yet it may be in your power to demonstrate with mathematical certainty that you are unstained with the alleged victim's blood. But how different with woman, whose chastity is once questioned; no eloquence can appease the credulous in her behalf—no proof can emancipate her from the damning influence of suspicion—there she is, repulsed and scorned, although as immaculate as purity itself!

Look to it, then, and see that you do not sacrifice character by hasty and unjust decisions.

Even in the days of Hippocrates it was admitted that substances will sometimes be expelled from the uterus of strong, plethoric young girls, and this, too, in perfect keeping with their chastity. That clever observer, Galen, to whom we are indebted for so much that is sound and practical, contended that, as hens will occasionally lay eggs without the tread of the cock, in the same way will it be possible for females to generate moles independently of sexual intercourse.* I imagine there can be very little doubt that the substances alluded to by Hippocrates, as being thrown from the uterus in robust and plethoric young girls, are identical with what will be observed oftentimes in congestive dysmenorrhœa.

I have, you will recollect, when speaking of menstruation, reminded you that the catamenial fluid consists of two distinct elements, viz. blood and epithelial mucus. Some writers, among others, Dr. Tyler Smith,† maintain that the mucous membrane itself passes off at each menstrual turn; but this I think is not so. As a general rule, it is simply the epithelium, the surface covering, as it were, of the mucous lining, which is expelled from the organ with the menstrual fluid, and the epithelium is again reproduced, only to pass off at the following monthly evacuation. On the other hand, however, it must be conceded that the mucous membrane itself has occasionally been recognised in the expelled mass. Plater long since published a case of this nature in a paper entitled, *Mola incipientis frequens dejectio*; and Morgagni has described, with

* The fact of hens and birds occasionally throwing off eggs without the tread of the cock, is physiologically extremely interesting. These eggs are not the result of fecundation, but merely the offspring of excitement. They are deciduous, and cannot be incubated, for the reason that they have not been vitalized by the male. There is a strict analogy between these eggs and the ovules, which pass with the catamenial fluid from the human female at each menstrual turn.

† Lectures on Obstetrics, Gardner's edition, p. 95.

great minuteness, a membrane thrown from the uterus, which possessed all the characteristics of the mucous covering of that organ.*

In the congestive type of dysmenorrhœa, it not unfrequently happens that, in consequence of the extraordinary afflux of blood to the mucous lining of the uterus, there is poured out a quantity of coagulable lymph, analogous to what occurs on the internal surface of the larynx in the membranous form of croup. This exudation of coagulable matter becomes, so to speak, a foreign substance within the uterine cavity; its presence stimulates the uterus to contraction; and, hence, there will be recurrent pains, simulating, in their general character, but in a much less exaggerated degree, the throes of labor. Finally, this substance is expelled from the uterus, and the pain subsides.

Now, gentlemen, this is not at all unlikely to occur in a young girl whose purity is beyond suspicion. Yet the phenomena to which I have just alluded may blast that girl's character if you are not prepared to show that they are in perfect accordance with chastity, and are the result simply of a pathological condition of the menstrual function. This coagulable lymph will sometimes be discharged in shreds or patches, and again it will assume the form of a sac or membrane, exhibiting a complete cast of the uterine cavity. In the *Gazette Medicale*, of Paris,† there is recorded by Dubois, of Neufchatel, an interesting case of a young woman who, at each menstrual period, expelled a hollow, membranous body, corresponding precisely with the shape of the uterus.

Besides this membrane, there will sometimes be thrown from the virgin and unimpregnated female, other substances; such, for example, as small, fibrinous masses, which appear, at first sight, to be organized, but oftentimes are simply coagula of blood; and again, there will be observed scales of epithelium, which, by possibility, might compromise the character of the woman. Therefore, in all such cases, where suspicion is on the alert, it is your duty, by a careful examination of these substances, to decide as to their true nature, so that, by the strength of your professional opinion, you may at once do justice to the girl, who has not only selected you as the guardian of her health, but at the same time the protector of her honor. In the case of the discharge of epithelial fragments, either from the uterus or vagina, the microscope will readily enable you to recognise the scales or squamæ, which consti-

* Follin, Lébert, and others have recognised in the dysmenorrhœal membrane the following peculiarities, known to exist in the mucous tissue of the uterus: 1. Considerable thickness, greater than that of any of the mucous surfaces of the body. 2. Tubulous glandules, readily detected with a lens, and visible even to the naked eye. 3. These glandules are united to each other by a fibro-plastic tissue and blood-vessels, which together constitute the dermis of mucous membranes.

† See *Gazette Medicale*, p. 729. 1847.

tute their characteristics ; and so, too, with regard to the fibrinous concretions ; these are usually small, almond-shaped bodies, with an undefined central cavity, and a smooth exterior. In none of these substances, of course, will there be the slightest vestige of any of the fetal annexæ, such, for example, as the villi of the chorion, fragments of the placenta, or umbilical cord ; and for the best possible reason, that their production is entirely independent of sexual intercourse, and consequently of pregnancy.

I could very readily multiply authorities on this question, but shall content myself with the following : Lamsweerde* divides moles into two kinds—one he calls the mole of generation, the other the mole of nutrition ; in reference to the latter, he affirms that a fleshy tumor may spring in the virgin womb from the matter of nutrition—" *Mola nutritionis*." This author insists that, for the production of the mole of generation, coition is absolutely necessary. Ruysch, † speaking of false moles, says, "Such moles have been forced out by virgins, or, at least, by such as were not suspected of being otherwise." The following is the language of Van Swieten : ‡ "It is certain that all those masses called moles, which contain a human embryo, and those which are formed by the corruption of the little placenta left in the womb, cannot be produced without coition. But it is equally certain that the sarcomas of the womb, and the masses that spring from clotted blood, may be generated without any coition. But as these are comprised under the general name of moles, it is evident that the name of moles should be used with great caution, lest untainted virgins and chaste widows should be branded with the infamy of incontinence!"

Can True Hydatids form in, and be expelled from the Uterus?—It has already been remarked, that what are known as true hydatids have no connexion whatever with a previous conception ; they are entirely independent in their origin of any such influence. Therefore, it is a question of unqualified interest to inquire whether it be possible for them to be generated within the uterus. It is true, science has but slender evidence recorded of the true hydatids being discharged from the uterus ; and the general belief is, that they cannot originate in that organ. Rokitsansky, § certainly a good authority, says, "Cysts are very rarely formed in the uterus ; we have not met with a single example in Vienna, and I myself have only inspected one case of uterine acephalocysts." Here, then, is an admission that, in one instance, at least, the true hydatids have originated in the uterus. The admission, therefore, of this one case, while it proves the extreme rarity of the occurrence, conclusively

* *Histor. Molar. Uteri*, cap. 1, p. 13.

† *Observat. Anatomic. Chirur.*, p. 54.

‡ *Commentaries on Apho. of Boerhaave*, vol. xiv., p. 180.

§ *Pathological Anatomy*, vol. ii., p. 291. London, 1849.

establishes the fact of the possibility of these formations. Indeed, I do not understand what there is in the anatomical structure of the womb at all incompatible with the growth of these acephalocysts; it is universally agreed that they are found in other portions and structures of the economy—why not, also, under certain circumstances, may they not originate in the uterus?

But a most material question is this: Have we any reliable means of distinguishing the true hydatids from the products originating from the degenerated villi of the chorion? This question may be answered affirmatively—under the microscope, and sometimes with the naked eye, when true hydatids exist, it will be observed that the cysts are inclosed one within the other; on the contrary, in the hydatiform vesicles, these latter, which may be rounded or oval shaped, are attached to each other by slight pedicles, and have not been inaptly compared to a string of beads. These distinctions are now recognised as ample to prevent any possibility of confounding the one with the other. The conclusion, therefore, is manifest, that, in all cases, in which these bodies, of either class, are discharged from the uterus of an unmarried female or widow, no deduction adverse to the party should be drawn except upon the evidence just mentioned; for science fully justifies the evidence.

LECTURE XXI.

Labor—Multiplied and Unprofitable Divisions of; Classification of the Author into Natural and Preternatural; Labor consists of a series of acts—Important Practical Deduction connected with this Succession of Phenomena; Duration of Pregnancy—When does it Terminate?—The Original Mode of Calculating Time; Calendar and Lunar Months—Has Pregnancy a Fixed Duration?—The Gardner Peerage Case—Conflicting Opinions; Testimony of Desormeaux—The Code Napoleon in reference to Tardy and Premature Births; Experiments of Tessier; Tropical Heat and Vegetation—How is the Period of Pregnancy to be ascertained?—The various Modes of Calculation—Dr. Reid's Experiments in reference to a Single Coitus; Naëgele's Opinion; Dr. Clay, of Manchester—Influence of the Age of the Parent on the Duration of Pregnancy—Can a Female be Fecundated during her Menstrual Period?—Case in Illustration.

GENTLEMEN—We have now, in the order of succession of subjects, reached an important and interesting topic—one which will necessarily demand much attention, for it is most intimately connected with your duties in the lying-in chamber—I mean *labor*. I am not a little surprised at the singular and multiplied divisions, which different authors have given of parturition. In my honest judgment, these divisions tend more to complicate than simplify the subject. Without, therefore, embarrassing you with what I am disposed to term unnecessarily minute classifications, I shall present you with a very simple division of labor, which, I think, you will recognise to be in entire accordance with the revelations of nature.

Divisions of Labor.—Labor, for all practical purposes, is either *natural* or *preternatural*. Natural labor, we denominate that form of parturition in which delivery is effected by the unaided efforts of nature; or, in other words, without the assistance of art. But, in order that nature may be thus adequate to the discharge of this duty, certain conditions are demanded both as regards the mother and child, and these conditions we shall enumerate in detail hereafter. Preternatural labor, on the other hand, as its name implies, is contrary to the natural process, and therefore, needs the interposition of science. It may be divided into *manual* and *instrumental*; in the former, the introduction of the hand is necessary to overcome the obstacle; in the latter, the hand being insufficient, the employment of instruments is indicated. Instead, therefore, of calling labor tedious, complicated, laborious, or difficult, after the example of most writers on this subject, we propose to discuss the various topics and duties connected with human parturition, under

the two divisions of *natural* and *preternatural* labor—divisions which will not only be recognised as just in the lying-in chamber, but which will embrace every possible contingency that may arise during the parturient effort.

Natural labor, when accomplished, may be said to be the separation of the mother and fœtus; it is the transmission of the latter through the maternal organs, in order that it may enjoy an independent existence, for which its previous uterine development has prepared it. Its organization is now so complete, that, when thrown into the world, it can breathe, and elaborate its own blood; it is no longer dependent upon the functions of the placenta; in a word, its birth constitutes it physiologically an independent being. This expulsion, however, of the fœtus and its annexæ from the parent womb is not a sudden and abrupt act—on the contrary, it is a deliberate effort on the part of nature—made up of a series of successive processes which, when in completion, constitute parturition. It is this very succession in the order of phenomena, which guarantees safety to the child, and immunity to the mother; so that, under ordinary circumstances, natural labor may be regarded as one of the functions of the female economy, in no way necessarily compromising human life; and I am quite certain that it is to “meddlesome midwifery” that much of the fatality of the parturient chamber is to be imputed.

The usual processes to which I allude as connected with the accomplishment of labor are, in the order of sequence, as follows: 1st. The uterus contracts, the result of which will be to dilate the mouth of the organ; 2d. The membranous sac or “bag of waters” is formed, and becomes ruptured, affording escape to the liquor amnii; 3d. After the escape of the amniotic fluid, the uterus grasps more firmly the body of the fœtus, resulting in an increased expulsive force, which accomplishes its delivery; 4th. The placenta and its annexæ—the cord and membranes—are then expelled; 5th. There is for some days a discharge from the vagina, known as the lochia. These, therefore, make up the chain of acts, or processes, which, in the aggregate, constitute child-birth, when accomplished by nature herself. Does not this very order of phenomena inculcate upon the obstetric student the order of his duties? It should emphatically impress upon him the necessity of studying nature in her own inimitable ways, so that when she is embarrassed by circumstances, which she cannot control, he may be there to act as her substitute, and render the needed assistance.

Duration of Pregnancy.—As preliminary to the consideration of your duties in the lying-in room, it is proper that we should examine three interesting questions—the period, the causes, and the signs of labor. The period at which labor commences, necessarily involves the discussion of the duration of pregnancy; for it

is evident that the termination of pregnancy is but the advent of labor. The duration of pregnancy, you must at once perceive, is a question of no trifling import; for the honor as well as the rights of individuals will oftentimes depend upon a just decision of this point. The popular opinion, endorsed by the general voice of the Profession, is, that the human female carries her infant nine months. Now, then, the question arises—can a female be spontaneously delivered before the expiration of this period—or can she retain the fœtus beyond the nine months consistently with fidelity to her husband, and the civil and social rights of her child?

The term nine months is too indefinite—it is wanting in precision, and for the very obvious reason, that between calendar and lunar months there is a fixed difference; so that nine lunar months or nine calendar months represent an important difference in time. Each lunar month embraces a period of 28 days—so that ten lunar months are equal to 280 days or 40 weeks. Nine calendar months, on the contrary, including February, represent 273 days, or 39 weeks. It is, therefore, perhaps, better, as many authors have done, to fix the period of human gestation, not at nine months, but at 40 weeks, or 280 days. There can be no doubt that, as a general rule, 40 weeks constitute, with the exception of two or three days, the true period of fœtal existence. But is this rule so general—in a word, is it so universal, that it admits of no exceptions? This is the plain putting of the question—and we shall now proceed briefly to examine it, for on its just decision must depend the highest social and legal interests. On this subject—as on many others—there is a difference of opinion. It has been much discussed, and the advocates on either side—earnest in pursuit of truth, except when animated more by love of victory than of justice—are arrayed against each other in the emphatic spirit of uncompromising controversy.

Those who contend that gestation has a universally fixed duration, and consequently reject the possibility of protracted or premature births, found their opinion on the following arguments: 1st. The uniform and immutable law of nature in the reproduction of all living beings—a law which defines, with unerring precision, the period of gestation for each species of animal. 2d. Against the possibility of protracted gestation, they invoke the aid of physical influence, for they maintain that the sojourn of the fœtus *in utero*, beyond the allotted time, would result in such an increase of volume as to render its safe delivery impossible. These, I think, are the chief arguments of writers, who oppose the idea of a departure from what they conceive to be the invariable standard of nature.

In order that you may understand that this difference of opinion, on the interesting question now under consideration, was not con-

fined to the men of the past ages, I shall cite the following important case, which was tried in the House of Lords in 1825, known as the celebrated Gardner Peerage Case:

Allen Legge Gardner, the son of Lord Gardner, by his second wife, petitioned to have his name inscribed as a Peer on the Parliament Roll. The Peerage, however, was claimed by another person—Henry Fenton Iadis—who alleged that he was the son of Lord Gardner by his first, and subsequently divorced wife. It was contended that the latter was illegitimate; and in order to establish this point, the evidence adduced was partly medical, and partly moral. Lady Gardner, the mother of the alleged illegitimate child, parted from her husband on board of his ship on the 30th of January, 1802. Lord Gardner went to the West Indies, and did not again see his wife until 11th of July following. The child, whose legitimacy was disputed, was born on the 8th of December of that year. Therefore, the plain medical question, taking the extreme view, was, whether a child born 311 days (*forty-four weeks and three days*), after intercourse (from January to December), or 150 days (*twenty-one weeks and three days*), from July to December, could be considered to be the child of Lord Gardner. If these questions were answered in the affirmative, then it followed that this must have been a very premature or a very protracted birth. There was no pretence that this was a premature case, the child having been mature when born. The question, then, was reduced to this: Was this alleged protracted gestation consistent with medical experience? Many medical witnesses, comprising the principal obstetric practitioners of Great Britain, were examined on this point. Their evidence was very conflicting—five positively maintaining that the period of gestation was fixed; and therefore, denying the possibility of such a protraction. The other eleven sustained the affirmative side of the question, and concurred in opinion that natural gestation might be protracted to a period which would cover the birth of the alleged illegitimate child. On the moral side of the question, it was clearly proved, that Lady Gardner, after the departure of her husband, was living in open adulterous intercourse with a Mr. Iadis; and, on this ground, Lord Gardner obtained a divorce from her after his return. It was contended that the other claimant was really the son of Lady Gardner by Mr. Iadis. The decision of the House was, that this claimant was illegitimate, and that the title should descend to the son of the second Lady Gardner.*

There are two interesting points in this case: 1st. The extraordinary difference of opinion among the medical witnesses; 2nd. The undoubted proofs of adultery on the part of Mrs. Gardner, on

* Taylor's Medical Jurisprudence, 5th edition, p. 586.

which ground alone the case was decided against her illegitimate offspring.

On this memorable occasion, the following was the opinion delivered by Sir Charles Clarke, certainly a man of no doubtful reputation: "*I have never*," he said, "*seen a single instance in which the laws of nature have been changed, believing the law of nature to be, that parturition should take place forty weeks after conception.*" There is an exclusiveness, might I not say, without meaning any disrespect, an arbitrary positiveness in this opinion, which is more in keeping with the *dictum* of an ancient Roman Emperor, than with the requirements of science. But Sir Charles Clarke was not alone in his views; he was sustained, in his general assumption, by Prof. Davis, Dr. Gooch, and others of equal eminence, who maintained that women never exceeded the ordinary period of gestation. Strange to say, however, as unanimous as these gentlemen were as to the cardinal point—the immutability of nature with regard to the period of human gestation—yet there was an extraordinary want of concurrence among them as to what measure of time that period really is!

Whether upon the witness's stand, or in the professorial chair, the opinion of a medical man is worth nothing except when in accordance with facts. Hypothesis is one thing; clear and well-established facts another. It seems to me that if human testimony is to be regarded, under any circumstances, as a guide for opinion, the possibility of protracted as well as premature gestation is placed beyond a peradventure. There are so many well-authenticated cases, thoroughly and essentially truthful, in confirmation of this statement, that I cannot understand how a contrary sentiment can, at least at the present day, prevail. I think a most satisfactory and irresistible evidence of the possibility of a gestation protracted beyond 40 weeks, or 280 days, is to be derived from the interesting case recorded by the learned Desormeaux, and it affords me much pleasure to advert to it, for the reason that, independently of his high character for learning and moral worth, I feel that I owe much to his personal kindness, for it was through his partiality that I was admitted, for a period of nearly two years, into the Maternité of Paris, during which time I had abundant opportunity of witnessing his tact and skill. After remarking, that "Observations, well attested, conclusively show, that the term may be prolonged beyond the usual period," he introduces the following case as having occurred within his own experience:

"A lady, the mother of three children, became deranged after a severe fever. Her physician was of opinion that pregnancy might have a beneficial effect on the mental disease, and permitted her husband to visit her; but with the restriction that there should be an interval of *three months between each visit*, in order that, if

conception took place, the risk of abortion, from further intercourse, might be avoided. The physician and attendants made an exact note of the time of the husband's visits. As soon as evidences of pregnancy began to exhibit themselves, the visits were discontinued. The lady was closely watched during the whole period by her female attendants. She was delivered at the end of nine calendar months and a fortnight, and Desormeaux attended her. If the nine calendar months were those of the smallest number of days, they would have equalled 273, in addition to which must be taken into account the days of the fortnight, which will make 287 days; but if the calendar months were not of the shortest period, there would be 276, to which are to be added 14, giving an aggregate of 290 days."

I cite this case to show that nature does sometimes exceed the ordinary period of 280 days, or 40 weeks; and it does seem to me, if it be demonstrated that, under certain circumstances, nature discloses a departure from the usual period of gestation, it is a concession amply sufficient for science, without involving the necessity of showing on what this departure is founded, or the conditions which regulate it. There are numerous other cases recorded by authors of equal probity, exhibiting not only the occasional protraction of gestation, but proving, beyond a shade of doubt, that women will sometimes bring into the world living children before the expiration of the 40 weeks.

Let me here remind you that one of the most enlightened countries of Europe, after a scrupulous investigation of all the facts for and against the question, has enacted, by legislative decree, in the Code Napoleon, that a child born 300 days after the departure or death of the husband, or 180 days after marriage, shall be considered legitimate, and, therefore, entitled to all its social and legal rights. It may, indeed, appear at first sight, that this enactment is one of too much latitude, and will oftentimes afford a mantle for the guilty. Be it so—but is that a justifiable reason for destroying the character of the pure and innocent? Indeed, there are cases reported upon authority which we have no right to question, in which human gestation has been retarded many days beyond the period sanctioned by the Code Napoleon. Dr. Simpson records, as having occurred in his own practice, cases in which the period reached 336, 332, 324, and 319 days. Dr. Merriman, 298 days; and Prof. Murphy, 297 days. Dr. Atlee reports two cases which nearly equalled 356 days each; and Prof. Meigs publishes a case, which he deems entirely trustworthy, of 420 days.

It is not for me to say that there was probably a miscalculation in some of these extreme cases; but admitting the error, which I do not think at all unlikely, yet with such acute observers, and with no motive to subserve but that of truth, it must be conceded that,

with a liberal margin for error in computation, these examples should be accepted as undoubted evidences of the fact that pregnancy will, occasionally, extend beyond 300 days.

If the main proposition be accepted, that the ordinary term of 280 days is not the universal term of gestation, and of this there can be no doubt, it appears to me an extremely difficult problem to fix the particular period of time, in which nature may be found to depart from her usual standard. After all, it must be admitted, the only important point in the discussion is this: *Is nature as regards the period of human gestation governed by any fixed and immutable law, or is the rule which she observes only a general one, subject to occasional exceptions?* That the latter is true is most perfectly demonstrated.

If we turn, for a moment, from the evidence deduced from the observations connected with human gestation, and examine the record of reproduction as it occurs in the lower animals, we shall find not only substantial, but very convincing testimony that nature is not governed by any uniform law as regards the particular period of pregnancy. The experiments of Tessier, made with great care, and with every effort to guard against the possibility of error, continued, too, for a period of years, have revealed some extremely interesting facts. His experiments embraced various animals—cows, mares, sheep, rabbits, &c.; and it should be remembered that the results gathered from these experiments are the more satisfactory, for the reason that they were not liable to the fallacy, or exposed to the possible error contingent upon this species of observation in the human subject. In 577 cows—and it is important as well as interesting to recollect the usual period of gestation in this animal is the same as in woman—20 calved beyond the 298th day, some reaching the 321st day—amounting to a departure from the ordinary term of within a fraction of six weeks. In 447 mares—the period of gestation is 335 days—it was noticed that 42 foaled between the 359th and 419th days, so that in them the greatest excess was 84 days. In the sheep and rabbits the same discrepancy was recognised; while in the hen, it was remarked that the period of incubation was often protracted for three days. These results have been amply confirmed by other observers.

The following are the observations of Prof. Krahmer, of Halle, made on the cow, and it will be seen that they accord, in their general results, with those of Tessier:

12 cows calved in the 38th week.				21 cows calved in the 44th week.			
72	"	"	39th	9	"	"	45th
335	"	"	40th	3	"	"	46th
429	"	"	41st	5	"	"	47th
135	"	"	42d	4	"	"	48th
33	"	"	43d	1	"	"	51st

But, gentlemen, it is altogether unnecessary to accumulate proof in support of the affirmative of the question. There can be no doubt that, in the great reproductive scheme, the general type is found to prevail throughout animated nature; and it must also be conceded that this type is subject to occasional variations, which, because they cannot be adequately explained, should not, therefore, be rejected. In the vegetable kingdom, the influence of climate and seasons is invariably admitted. Under the genial rays of a southern sun, the earth sends forth its fruits with a precocity unknown to the more northern latitudes. May it not be that there is some kindred, yet occult influence exercised upon the human system which, in one case, leads to a premature development of the germ, while in the other, it retards the reproductive processes of nature? This hypothesis, it appears to me, is about all that the present state of science can furnish in explanation of premature and protracted births.

I might have mentioned that Dr. Charles Clay, of Manchester,* whose name is so honorably interwoven with the operation of ovariectomy, in which he has had most remarkable success, has promulgated the suggestion that the duration of pregnancy may be influenced by the age of the parents, and from the observation of cases, which have occurred in his own practice, he believes that the younger the mother, the shorter is the period of gestation. This theory corresponds with the very general belief that the older the animal the more protracted will be the duration of pregnancy.

From all that we have said on this subject, we may, I think, safely arrive at this conclusion—that *the precise duration of pregnancy is not positive, but simply relative.*

Period of Pregnancy.—How is the period of pregnancy to be ascertained—or, in other words, is there any rule by which the term of an ordinary gestation can be estimated? This inquiry is one of more than usual interest, and will have a bearing on your duties as practitioners of midwifery; for you will often be questioned by your patients in regard to the particular period of their gestation with a view of knowing when they may expect their approaching confinement. There are various modes of calculation, and I think they may be classified as follows: 1st. The peculiar sensations experienced by the female at the moment of conception; 2d. The period of quickening; 3d. From a single coitus; 4th. From the last menstrual period. Let us now examine briefly, and in order, each of these tests.

I. Peculiar Sensations.—The notion that a woman is made conscious of the instant of her fecundation by a sensation, characteristic

* Observations on the Term of Utero-Gestation. By Charles Clay, M.D., p. 9.

and peculiar, is not one of modern origin. This opinion has prevailed for a long time; indeed, it can be traced back to Hippocrates himself who, in speaking of conception, observed: "Liquido autem constat harum rerum peritis quod mulier, uti concepit, statim inhorrescit, et incalescit, ac dentibus stridet, et articulum reliquumque corpus convulsio prehendit et uterum torpor, idque iis, quæ puræ sunt, accidit,"* which may be rendered into our own tongue thus: It is well understood by those skilled in these matters that the instant a woman conceives, she experiences a general shivering and heat; her teeth chatter, and the articulations with other portions of the body are thrown into convulsive movement, while the uterus itself is attacked with numbness, and this occurs even to women quite pure. Van Swieten says, "From many observations, we are assured that women, in the act of copulation, when they are impregnated, enjoy a more than ordinary degree of pleasure; this change in the female organs appropriated to generation is also, with good reason, thought to be greater at the time of conception, than when coition is performed, without impregnation immediately following."† There is one insuperable objection to this theory of sensations as a guide for computation, and it is, that whatever may occur in individual cases, the fact is abundantly established that occasionally women will conceive who do not experience the slightest feeling of sexual pleasure—they are as inanimate as the bed on which they repose; and, under such circumstances, I have known ladies continue incredulous as to their true condition until the very approach of their labor, so fully were they imbued with the popular conviction that sexual enjoyment and impregnation bear to each other the necessary relation of cause and effect. I am aware that some modern authors concede to this theory of sensations a very marked value; and, while I am willing to admit that, in certain cases, from some peculiar feeling, more readily experienced than explained, a woman may become satisfied that she has been fecundated, yet, as a general principle, the evidence is deceptive, and presents, therefore, no claims as a reliable test.

II. *The Period of Quickening.*—It is recommended by some writers to take the time of quickening as a rule for calculation, and they assume that, as the woman quickens at the fourth and a half month, it is quite easy to ascertain the termination of her pregnancy by the addition of four and a half months to the time at which she first felt life. The fallacy of this rule must be obvious, if it be recollected that the time of quickening is by no means a fixed one. Some women feel life at four months, others a little earlier, others not until the fifth month; again, in some instances, the entire term

* De Carnibus, cap. 8, tom. v. p. 309.

† Commentaries upon Aphorisms of Boerhaave, vol. 13, p. 369.

of pregnancy will pass without the slightest consciousness on the part of the female that she carries within her a living being.*

III. *From a Single Coitus*.—Efforts have been made to determine the duration of pregnancy by calculating from a single coitus; but it is very evident, that this mode of computation is liable to much deception, for the reason that the majority of such cases would most probably occur in the unmarried, who, of course, to diminish the measure of their shame, would very naturally refer their impregnation to a solitary intercourse. Some interesting statements, however, founded upon researches conducted with every care to elicit truth, and guard against the possibility of error, have been made by Dr. James Reid, in regard to the question of a single coitus. The following table, embracing forty-three cases, collected by him of conception, supposed to have resulted from a single intercourse, exhibits features not unworthy of attention:†

260 days after single coitus, delivery occurred in 1					
263	"	"	"	"	1
264	"	"	"	"	2
265	"	"	"	"	1
266	"	"	"	"	2
270	"	"	"	"	1
271	"	"	"	"	2
272	"	"	"	"	3
273	"	"	"	"	1
274	"	"	"	"	7
275	"	"	"	"	2
276	"	"	"	"	5
278	"	"	"	"	1
280	"	"	"	"	3
283	"	"	"	"	2
284	"	"	"	"	1
286	"	"	"	"	1
287	"	"	"	"	2
291	"	"	"	"	1
293	"	"	"	"	2
296	"	"	"	"	1
300	"	"	"	"	1

According to this table, the duration of pregnancy, dating from a single coitus, will average about 275 days; and Dr. Reid deduces the fact that, from a single coitus, the time will be 39 weeks, while in calculating from the last catamenial turn it will be forty; and he accounts for this difference of time on the supposition that from two to six days will probably elapse after the last catamenial evacuation, before fecundation is consummated. Dr. Montgomery presents an analysis of twenty-five cases of gestation, dating from a single coitus, the average duration of the pregnancy being 274 days. Dr. Matthews Duncan, in an interesting paper on the subject, holds the average interval between *insemination* and parturition, to be 275

* See Lecture XII.

† London Lancet, 1850-3.

days. This average he obtained from the observation of forty-six cases.*

IV. *From the Last Menstrual Period.*—A very common mode of calculation, both among the profession and women themselves, is to take the last catamenial turn as the starting point. Some date from the last day of the menstrual evacuation, others from two weeks subsequently. In either of these modes of computation, there will necessarily be more or less want of precision. I think the fact is very generally conceded, that the most likely time for a female to become fecundated is immediately after a menstrual crisis; but, it is equally well established, that impregnation will occasionally occur just before the catamenial period, and sometimes during the menstrual flow, while, on the other hand, it must not be forgotten that conception is possible at any time between the two menstrual turns.† It is very evident, that, this being the case, there will sometimes be a considerable discrepancy in time in the various conclusions attempted to be deduced. I have, for several years, adopted a rule which, I believe, was originally suggested by the celebrated Naëgelè; with some exceptions, I have found it generally quite reliable, and far more satisfactory in its results than any plan which has yet been proposed. Imagine, for example, the termination of the last menstrual period to be on the 10th day of January; then count back three months, which will correspond with the 10th day of October; now from the 10th of October, add seven days—this will bring you to the 17th day of October—the day on which the labor will commence. This, I repeat, has, according to my observation, proved a most satisfactory test; and I, therefore, commend it to you with much confidence. According to this mode of computation, the short and long months are taken promiscuously together, and the addition of seven days constitutes the average difference in the time.

Many authors have thought it difficult to compute the period of pregnancy, because, they allege, it is not known what particular time elapses from the moment of fecundation until the germ reaches the uterine cavity. But I cannot perceive much force in this argument; and, in my opinion, it matters not whether one or ten days are needed for the transmission of the fecundated ovum to the uterus; the true mode of calculation is from the moment of fecundation, and hence the value of Dr. Reid's tables, which show that the ordinary duration of pregnancy, from a single coitus, is

* Monthly Journal of Med. Sci., March, 1854.

† M. Raciborski has paid very particular attention to the subject of menstruation as connected with fecundation; and he has shown that the general rule is, that women become impregnated immediately before or after, and even during menstruation, and that the exceptions to this law are not more than six or seven per cent. For some interesting facts bearing on this question, the student may consult with profit, his work, "Sur la Ponte des Mammifères."

about two hundred and seventy-five days; and this, I think, is confirmatory of what we have endeavored to show in a previous lecture, that the particular point at which the ovule of the female and the spermatozoon of the male meet is the ovary itself—so that, you perceive, the entrance of the germ into the uterus is one thing, and the fecundation of the ovule is another. The instant contact between the ovule and spermatozoon occurs, the work of growth and development commences; and it is not improbable that it is to a forgetfulness of this fact that much of the discrepancy in the calculation of the duration of pregnancy is to be attributed.

I have told you that conception will sometimes be accomplished during the catamenial period; and I have now, in my mind, a ludicrous, yet painful case, in corroboration of this fact. Not a very long time ago, a gentleman called upon me, with the request that I would visit his wife professionally at one of the hotels in this city. The appointment was made, and I was there at the hour named—nine o'clock in the evening. As I was approaching the office of the hotel, for the purpose of sending my name to the lady's room, I felt a gentle, but what I thought nervous tap on my shoulder, and looking round at once recognised the countenance of the gentleman who had arranged the appointment with me; the expression of that countenance was fit for the study and development of the inimitable Hogarth, and it, indeed, seemed pregnant with the details of the future. Pale and haggard, he hurriedly took me by the arm, and in a sort of whisper, observed, "This way, Doctor." After ascending two flights of steps, which was accomplished in a marvellously brief period, impelled on as I was by my restive companion, he took a key from his pocket, with which he unlocked the door, and requested me to enter. I had, perhaps, seen darker nights than that, but, I doubt, whether I had ever been thus unceremoniously thrust into a darker room. The moment we had entered, he locked the door, and though I had not uttered a syllable, he hastily remarked, "Doctor, be quiet!"

Well, I thought the whole thing very droll, and really it was assuming something more than a broad farce; and, without a moment's delay, I very emphatically observed: "Sir, instantly do one of two things, either unlock this door or give me a light!" I had scarcely made the demand before my companion in the dark applied a match to a gas-burner. I will not attempt to describe the scene disclosed through the influence of that little loco-foco match! Suffice it to say, that a female, ghastly pale and almost bloodless, lay on the bed. My nervous companion imploringly asked me to do something to save her life, which was fast passing away. I soon ascertained the true cause of the patient's extreme prostration. She was not married, and therefore not the wife, as had been alleged, of the gentleman who had requested my services.

The victim of a cruel seduction, she had been brought to New York for the purpose of getting rid of the evidence of her shame; and with this view her seducer sought the aid of one of those many wretches with whom our city is unhappily but too abundantly supplied, always ready for the perpetration of crime, no matter how monstrous, provided the wages of their guilt—the money—can be had. I learned that one of these self-styled "Doctors" had, for the last three days, been at work on this unhappy girl, and after inflicting on her great suffering, had left her in her present melancholy condition. You will scarcely credit it, but the fact is nevertheless so, that this poor creature, after enduring extraordinary agony, both moral and physical, was abandoned by this trafficker in human life, to die! He had received the wages of his sin, and he was content! The abortion had been produced, and the fetus removed from the house, but the after-birth was still within the uterus. Now, under these circumstances, what was the course for me to pursue? Could I, with any moral justification, abandon this poor girl in the hour of her need? Could I allow her to sink for the two reasons, first, that she had been seduced, and secondly, because she had been attended by an abortionist? It would be the refinement, not to say the absurdity, of casuistry, to admit any such principle of guidance as this for the physician, who feels that one of the great objects of his profession is to heal the sick and give succor to the distressed. As well might it be argued that the surgeon should refuse to dress the wounds of a man shot in the act of burglary. I imagine that strict ethics exonerate the physician from any of the antecedents of such examples—his duty is to bind up the wounds, and administer to the suffering patient, regardless of all extraneous circumstances. Seeing, therefore, the deplorable condition of this unfortunate young woman, I did not hesitate to proceed at once in the discharge of my duty as a medical man. I gave her the strictest professional attention, and, in a short time, she entirely recovered from her illness.

My object in introducing the case to your notice is, for the purpose of directing attention to a statement made by the pretended husband. He declared to me most positively that he had never had intercourse with the girl, *except during her menstruation*; and he mentioned the fact on the ground that he had always heard that a woman could not conceive while she had "her flow upon her." I remarked to him that I thought his personal experience was now amply sufficient to demonstrate the error of that theory. With cool effrontery he remarked, "Doctor, I think you know all about it, and if you will only tell me how it is possible to avoid having children, I will make you a substantial present!" "Sir," I remarked, "the only remedy for your case is, that you immediately consent to become an *altered* man!" He saw the point of the advice, and said nothing more on the subject.

LECTURE XXII.

Determining Cause of Labor—Meaning of the Term; The Expulsive Forces—primary and secondary; Determining Cause referred by some to the Fœtus, by others to the Uterus; Opinion of Buffon with regard to the agency of the Fœtus; Ancient Doctrines; Uterus the true Seat of the Determining Cause of Parturition; Antagonism between Muscular Fibres of Body and Neck of Uterus; Change in Structure of Decidua and Placenta, as alleged by Prof. Simpson; Haller's Theory of the Decadence of the Placenta; Objections to the Theory; Dr. Brown-Séquard's Theory—Carbonic Acid the Stimulant to Muscular Contraction; The Doctrine of Ovarian Nisus, as propounded by Carus, Mende, and Dr. Tyler Smith; Objections to the Doctrine; Is Menstruation Peculiar to the Human Female? The Theory of Dr. John Power, adopted by Paul Dubois, of Paris; Objections to the Theory; Explanation of the Author as to the Determining Cause of Labor; Modifications in Structure of Uterus at Close of Gestation; Peristaltic Movement of Uterine Muscular Fibre; Inherent Contractions; These Inherent Contractions independent of Nervous Force—Proof; Connexion between Inherent Contractions and Matured Development of Muscular Structure of Uterus; Irritability of Muscular Tissue of Uterus increases as Pregnancy advances—Deductions from this Fact; Modifications in Structure of Uterus after Child-birth; Diminution of Musculo-fibre Cells; Fatty Degeneration, a Natural Change in certain Structures after they have completed their Functional Activity—sometimes a Pathological Result.

GENTLEMEN—Having, in the preceding lecture, called your attention to the period at which labor occurs, we now approach the consideration of a question which has called forth numerous theories for its explanation, both from the older and more modern writers—I allude to the *determining cause of parturition*. Before we proceed further it should be clearly understood what is intended to be conveyed by the *determining cause* of labor. It means nothing more than this: that peculiar influence which first excites the muscular fibres of the uterus to contraction. In order that you may have a precise and comprehensive view of the question, let us suppose that the impregnated uterus has passed through its various phases of development, the fœtus has attained its maturity, and the time for its transmission into the world has arrived—what principle is it which gives the first impulse to that series of muscular contractions which, when completed, accomplish the expulsion of the fœtus and its annexæ? This is the simple, yet interesting question before us, and one in every way worthy of thought. There can be no doubt that the expulsive forces, which result in the delivery of the child, are two, which obstetricians have divided into, 1st, the

primary, or efficient; and 2d, the secondary, or auxiliary. The former, the primary, are the contractile efforts of the uterus; the latter, the secondary, the contractile efforts of the diaphragm and abdominal muscles. But what we are now in search of is—*that peculiar something, which is the original starting-point of these two classes of forces.* In one word, what is it that gives the original impulse to the parturient effort?

Is the Determining Cause in the Fœtus?—As I have already observed, there is a remarkable discrepancy of opinion on this subject—some referring the determining cause to the action of the fœtus, while others maintain that it originates in the uterus itself. It was the opinion of the great naturalist, Buffon, that the fœtus is the agent of its own expulsion; and this idea was no doubt derived from the supposed analogy between the human embryo and chick—the latter, as is well known, breaking its shell as soon as the period of its incubation has been completed. This hypothesis of the distinguished Naturalist will not abide the test of examination; indeed, it is utterly at variance with facts. If the determining cause of labor be due to the action of the fœtus, how does it happen that the latter is expelled from the uterus after it has ceased to live for days, and sometimes weeks, previously to the termination of pregnancy? Again, how is the placenta expelled?

The doctrine—that the fœtus causes its own exit from the uterine cavity—did not, however, originate with Buffon; on the contrary, it is a very ancient notion; and it is amusing to read the various explanations given why the developed embryo is induced to seek and accomplish its entrance into the world. It was alleged, on the one hand, that the fœtus, at the period of its full intra-uterine growth, suffered from want of adequate nourishment; and hunger, therefore, prompted it to leave its parent. It was maintained, also, that the space in which it was confined was too limited—it felt an instinctive longing, I suppose, to extend the area of its liberty; and the opinion likewise prevailed, that the desire to pass its water, and evacuate the intestinal canal, were among the causes which moved it to change its place of abode. It can scarcely be necessary for me to point out the fallacy of these views; they may be ranked among the fancies of the good old fathers, having nothing in truth to sustain them.*

Is the Determining Cause in the Uterus?—It is very generally

* Harvey maintained that "in the birth of living creatures, the chief cause of birth is in the fœtus; I mean as to its effort, not to its weight, as Fabricius says, &c.; the fœtus itself runs its head against the inclosures of the womb, opens them by its own strength, and struggles into daylight."

"In vivipararum partu præcipuam nascendi causam fœtui deberi. Molimini, inquam, ejus non autem ponderi ut Fabricius voluit, &c.; ipse fœtus prono capite uteri claustra aggreditur, eademque propriis viribus recludit; et in lucem eluctatur." [De Generat. Animal., pp. 366-7.]

conceded, that the determining cause—whatever it may be—resides in the uterus itself, the fœtus being in no way concerned in the original impulse to contractile effort; and here, again, we have theory upon theory promulgated in explanation of this peculiar influence, known as the excitant of uterine contraction. It would be needless, and totally unprofitable, to enumerate these various hypotheses; I shall, therefore, content myself with a simple allusion to a few of the more prominent of them. A theory, which has obtained much countenance from the profession, refers the determining cause of labor to a cessation of antagonism between the muscular fibres of the neck and body of the uterus—the evidence that this antagonism no longer exists being furnished by the fact that the length of the cervix has entirely disappeared, and exhibits nothing more than a circle, or, as it is sometimes termed, a ring. This explanation finds no support at the bedside; for how frequently does it happen, in cases of abortion, for example, that the uterus is thrown into contraction before the slightest shortening of the cervix can be detected; and again, the cervix will occasionally have lost its entire length for several days, and even weeks, before the contractile efforts of the uterus manifest themselves.

Professor Simpson has recently suggested the idea, that the primary impulse to uterine contraction is due, in the first place, to a change in the structure of the decidua and placenta, and, secondly, to a loosening or separation of these bodies from the internal surface of the uterus—the modifications of structure being the result of the maturity of the ovum. This view is kindred to the opinion of Haller and others, who likened the placenta to the stem of the fruit, and argued, that as the matured fruit falls from the parent tree, because of the decadence of its stem, so does the placenta, when gestation is completed, detach itself, and thus become the exciting or determining cause of parturition. The idea, if true, would necessarily imply that the primary link, in the chain of phenomena constituting labor, is the detachment of the placenta from the uterine surface; but to admit such an assumption would be directly contrary to what really occurs—it would, indeed, be confounding the cause with the effect.

The placenta, except under certain circumstances of disease affecting it, or in cases of sudden concussion, becomes detached from the womb, not through any decadence, but simply through the force of uterine contraction. If this were not so, if the first effort of childbirth resulted from the separation of this body, the necessary consequence would be hemorrhage, more or less profuse. How often does it occur that some minutes elapse after the expulsion of the fœtus, before the afterbirth is separated from the womb? It may be safely said, I think, that, as a general rule, the placenta remains in adhesion with the uterus until the child has been thrown

into the world; or, to speak more properly, *as the child is passing through the vulva, the work of separation is going on, so that when the egress of the fœtus has been accomplished, if the uterus should be felt in the hypogastric region, firm and contracted, this affords very substantial evidence that the afterbirth is no longer in connexion with the walls of the organ.* What is the true explanation of hemorrhage in childbirth? Is it not, except in cases of *placenta prævia*, the direct result of inertia of the womb after a partial or complete detachment of the placenta? If this be so—and who will doubt it—with this theory of the early separation of the afterbirth as the determining cause of labor, how few parturient women would escape the dangers of flooding?

Dr. Brown-Séquard* says, "The uterus, in pregnancy, becomes more and more irritable every day; and when its irritability has arrived at a very high degree, then the slight excitation produced by the carbonic acid normally contained in the blood, is sufficient to put it in action."

Let us next turn to what has been denominated the ovarian theory of parturition. Dr. Tyler Smith, in accordance with the opinion of Carus, Mende, and others, has attempted to show that the determining cause of parturition is but the product of ovarian excitement. He holds that, during the entire term of gestation, the ovary becomes the seat of recurrent excitement, corresponding with the ordinary catamenial periods; and moreover affirms that, in consequence of this local congestion of the ovary, there is more or less tendency to abortion at each of these returns. It will be perceived that this hypothesis clearly refers the entire act of uterine contraction to that important and interesting principle—reflex influence; the ovarian nerves being the *excitors*, which, conveying the stimulus of irritation to the medulla spinalis, cause this latter to infuse into the *motor* nerves of the uterus an impulse, which results in contractions of the organ.

The theory of Dr. Smith is not without objection. In the first place, I do not regard it as at all settled that ovulation goes on during pregnancy, and without this, why should the ovary become the seat of a periodical *nisus*?† Secondly, while it cannot be denied that the duration of pregnancy is usually a multiple of the menstrual interval, yet this is far from being necessarily the case. A very substantial objection to this hypothesis is disclosed by the fact announced by Professor Simpson—he removed the ovaries during the latter period of pregnancy without in any way interfering with the phenomena of parturition. But it seems to me

* Experimental Researches, &c., p. 117.

† Scanzoni is also of opinion that ovulation continues during gestation; but numerous autopsies by Virchow, Kussmaul, and others, prove that if the function really persist in some women, it must be regarded as a rare exception.

that an irresistible and conclusive argument against the theory is this: Dr. Smith, if he be correct in his opinion, would make the parturient effort essentially dependent upon nervous influence, or, in other words, he would refer it to reflex action. Before concluding this lecture, we shall endeavor to demonstrate the fallacy of this proposition, and prove that the uterus enjoys two distinct forms of contraction—one, inherent, independent; the other, extraneous, dependent, or, more properly speaking, the result of nervous force.

I have an abiding faith in the analogies of Nature, and I believe that she is perfectly consistent in them. Indeed, many of the solid principles of our science are derived from the proofs furnished by these very analogies. Now, it appears to me, that the ovarian theory of parturition, if it be founded in truth, should not only exhibit, under a normal condition of system, a universality in its application so far as the human female is concerned, but it should also disclose a necessity for its influence in determining the parturient effort in animals generally. We have just seen that if the ovary, under any circumstances, be capable of evoking uterine contraction at the close of pregnancy, it is not always the starting-point of this phenomenon; and, on examination, it will be readily understood, that the truth of the theory is not borne out by what is observed in the parturition of animals; in a word, it has not the support of analogy.

But let us, for a moment, examine this theory under another point of view. The doctrine is very generally maintained that menstruation is peculiar to the human female. If, by this, it be intended to convey the idea that the function, as it exhibits itself in woman, with all its phenomena, its duration, etc., is exclusively recognised in her, then I can see no objection to the doctrine, for it is founded upon undeniable evidence. If, on the contrary, it be argued that during the period of *heat*, certain animals do not have any sanguineous discharge, no matter how slight, or for how short a time, then I object to the doctrine, for it is adverse to the evidence furnished us by accurate observation. Examine, for example, the slut at the time she is about to take the dog (her period of *heat*), and you will find not only congestion of the parts, but also a slight sanguineous emission; the same thing will be observed in the cow, mare, and other animals, which, it is well known, will only receive the male at this time, and at no other; and during the period of *heat* the same phase occurs, which is so characteristic of the catamenial crisis in woman, viz. the maturation, and subsequent escape of ovules.*

There is much variation in the period of *heat* among different

* See Lecture vii.

animals; in the slut, for instance, it takes place twice in the year, and continues about fourteen days each time; in the cow, and other domestic animals, it is more frequent than in wild animals, but it is not marked by any definite periodical occurrence. The duration of pregnancy in the cow is in correspondence with that in woman; and, at the completion of her term, the animal is thrown into labor—but, will it be contended, after what has just been said, that the determining cause of parturition in the cow is a multiple of the menstrual interval? I again repeat my faith in the doctrine of strict analogy, and I believe the uterus of the cow, when her gestation is completed, contracts in obedience to the same influence, which constitutes the *primum mobile* of parturient effort in the human female. What this influence is we may or may not be enabled to explain before we conclude this lecture.

Dr. John Power,* some forty years since, suggested a theory in explanation of the determining cause of labor, which, undoubtedly, possesses the merit of plausibility, and which has, of late, had new strength added to it in consequence of its adoption by Prof. Paul Dubois, the eminent Parisian obstetrician.† In order that you may thoroughly understand Dr. Power's hypothesis, I shall quote his own language:

"All organs which are intended to retain, for a time, and afterwards to expel their peculiar contents, are furnished with sphincters, placed at their evacuating orifices. The most remarkable of these are the rectum, the bladder, and the uterus.

"The sphincters of the above organs are possessed of two distinct properties—in the first place, they act as valves to prevent improper evacuation; and secondly, they are endowed with a peculiar sensibility which enables them to regulate the necessity or propriety of discharge; and for this latter purpose especially, they are supplied with a larger proportion of nerves of sensation than the bodies of the organs to which they belong.

"To produce the evacuating action of any of these organs, the exciting stimulus must be applied to the sphincter, when the organ contracts and expels its contents.

"The existence of sphincters, as above described, is universally admitted with respect to the rectum and bladder; but the claim for such structure, with regard to the uterus, is novel; and, therefore, it will be desirable to illustrate the theory, and advance proofs and arguments in support of it.

"In the first place, I shall make some observations respecting the

* A Treatise on Midwifery, developing new principles. By John Power, M.D. London. Second edition. 1823. Pp. 23.

† The Theory of Dr. Power has also received the endorsement of Prof. Henry Miller, M.D., the late distinguished Prof. of Midwifery in the University of Louisville. [Principles and Practice of Obstetrics, by Henry Miller, M.D., p. 300.]

analogous action of the rectum and bladder, and then proceed to point out the nature and effects of the sphincter of the uterus, as explanatory of the exciting causes of labor.

"The *faeces*, received from the colon, are protruded forward along the rectum until they arrive at the sphincter ani, when, in consequence of the impression made upon that part, the action of the rectum is elicited, and they are expelled. That this irritation of the sphincter is here the cause of expulsion may be inferred from the fact, that if the motion for evacuation be attended to, the first perception of it is always at the sphincter, and rarely felt under the earlier periods of accumulation in the rectum, unless indeed the *faeces* are in a fluid or acrid state, so as to be more readily admitted into contact with the sphincter, or to produce more stimulating effects upon it. This proves that the expulsive action is the effect of stimulation, and not distension. We have equal or more decided evidence of the same principle operating in the evacuation of the bladder.

"I shall now attempt to show that the cervix and mouth of the womb discharge all the functions which have been above assigned to sphincters. The cervix appears anatomically distinct from the body of the uterus. It experiences comparatively little change from conception, until the pregnancy is half completed, the enlargement of the womb having, in the earlier months, evidently proceeded from the body exclusively, and, it is most probable, that throughout the whole term, it continues to be derived therefrom.

"The cervix, until the end of the fifth month, retains its former length; after this time, it begins to experience a gradual diminution, until, at the termination of pregnancy, it has entirely disappeared. The contents of the uterus, which the intervening cervix had previously kept at a determinate distance, are now admitted into direct contiguity with the orifice.

"When we take into view the manner in which the orifice is supplied with nerves of sensation, it is fair to infer that it is endowed with a peculiar function, and a high proportion of sensibility; and were we to admit that a stimulus applied to it would, in a manner analogous with the above-recited production of *faecal* and urinary evacuations, have the effect of exciting parturient contractions of the uterus, it must be allowed that a necessity exists, during the period of *fœtal* evolution, for the interposition of a valve between it and the uterine contents, to prevent their premature expulsion. This valve, we conclude, is found in the cervix, and the beautiful simplicity of the contrivance, as well as the undeviating and admirable manner in which nature gradually resumes it before labor comes on, is a fine illustration of the providence of the Divine Creator to prevent the generative actions from being rendered abortive, and secure, at the due time, their propitious consummation.

"That the orifice of the uterus is the medium through which the parturient actions are excited, is strongly confirmed by the fact, that contractions of the uterine fibres may be occasioned by an artificial stimulus, applied to the part in question, proving that the cause presumed is adequate to produce the effect assigned to it.

"Another proof is, that a defect of orificial irritation will be followed by a deficiency of parturient contraction. Thus the labor goes on slowly, or is suspended, when the presenting parts are prevented from making proper exciting pressure on the orifice, as in cases of malpresentation, malformation of the child or pelvis, or where the head recedes in consequence of rupture of the womb, or where the belly is pendulous, etc.

"Labor, however, does not always come on as soon as the cervix is obliterated, and occasionally takes place previous to that event. These circumstances require some explanation.

"A given and determinate impression of the orifice, differing in degree according to the constitution of the individual and existing sensibility of the part, is necessary to give rise to the uterine contractions. Thus, the mere gravitation of the uterine contents in the direction of the orifice, is not alone sufficient to produce them; the pressure and tension given by the insensible contractions must be superadded. If this is wanting, or weak, labor will still be postponed. On the contrary, if it happens to be strongly or prematurely excited, as it may be, by evacuating the liquor amnii, and various other causes, before the cervix has been naturally obliterated, it may have the effect of either hastening that event, or of stimulating the cervical parts sufficiently to occasion premature action.

"The gravitation of the contents of the uterus, doubtlessly co-operates in producing the insensible contraction, while the latter tends to complete the cervical obliteration; and, it is probable, that they continue in giving rise to the uterine contractions. Thus, as I before observed, they operate as cause and effect to each other."

I have given this long extract from Dr. Power's clever work because I was desirous that you should read his own words in explanation of his peculiar theory—a theory which, as I have already remarked, has recently been accepted as the truthful exposition of the determining cause of labor by one of the highest living obstetric authorities.

It is quite manifest that Dr. Power refers the original movement of parturient action exclusively to nervous force, brought into play through the agency of reflex influence. With him the starting-point is irritation of the excitor nerves of the *cervix uteri*, resulting in a reflex impulse, which puts, if I may so term it, the wheel of muscular contraction of the uterus in motion. I may be in error but it really seems to me that Dr. Power, in his attempt to

sustain his ingenious theory, has himself furnished conclusive objections to it—they are, in fact, the very objections which, to my mind, are entirely subversive of all his reasoning. You are critically to bear in mind that his main proposition is this—*that at the end of gestation the cervix uteri having, through the process of shortening, entirely disappeared, “the contents of the organ, which the intervening cervix had previously kept at a determinate distance, are now admitted into direct contiguity with the orifice.”*

It is this very contiguity, you must remember, which causes the impression upon the excitor nerves of the part. Well, for argument's sake, suppose that we admit the truth of this reasoning in cases in which the above phenomena occur, viz. the obliteration of the cervix, and the pressure of the presenting part of the fœtus against it. How shall we satisfactorily explain the determining cause of labor in instances in which, notwithstanding the obliteration of the cervix, there is no pressure made upon it? This is the very objection suggested by our author, but strange to say, instead of regarding it as an objection, he says, “Another proof is, that a defect of orificial irritation will be followed by a deficiency of parturient contraction. Thus, the labor goes on slowly, or is suspended when the presenting parts are prevented from making proper exciting pressure on the orifice, as in cases of *malpresentation, malformation of the child or pelvis, or where the head recedes in consequence of rupture of the womb, or where the belly is pendulous, etc.*”

Do you not see, gentlemen, that the language which I have just quoted, in lieu of a proof, is a positive upsetting of the whole theory; for, in cross presentations, in which it is physically impossible for the presenting portion of the fœtus to make exciting pressure on the orifice, labor comes on, and regular uterine contractions supervene. In these latter instances surely the theory is at fault; for it cannot, under these circumstances, explain the determining cause of parturition. *Falsus in uno, falsus in omni*, is a sound maxim in law, and bears with equal force on the question now before us.

Dr. Power says, “Labor, however, does not always come on as soon as the cervix is obliterated; and occasionally takes place previously to that event.” Now the very explanation which he gives of the two facts contained in the last quotation militates in the most positive manner against his theory, for he remarks, “A given and determinate impression of the orifice, is necessary to give rise to the uterine contractions. Thus, the mere gravitation of the uterine contents in the direction of the orifice is not alone sufficient to produce the pressure; and tension given by the insensible contractions must be superadded. *If this is wanting or weak, labor will still be postponed.*” The italics here are my own, and I have pur-

posely made them in order that you may see the language thus italicized is a surrender of the whole argument. If it have any meaning it signifies simply this—that the mere pressure of the presenting portion of the fœtus against the uterine orifice is not always adequate to evoke the parturient effort, and that sometimes the “*insensible contractions*”^{*} are needed for this purpose. This is nearly my own opinion, and so firm am I in this belief that I shall endeavor to show that not only are these contractions *sometimes* needed, but they universally, in a normal state of things, precede any reflex or nervous force, and are entirely independent of what Dr. Power calls “official irritation,” as I shall now proceed to demonstrate.

When the period of gestation has been completed, it will be observed that the muscular fibres of the uterus, as the very first act in the parturient process, commence a sort of peristaltic movement. This movement or contraction is what may be denominated a *per se* movement—it is inherent, independent, and is to be referred exclusively to the irritability of the muscular structure of the uterus, having no connexion whatever with a reflected or nervous force. These contractions are similar to the peristaltic movements of the intestinal canal, which are admitted to be the result of inherent irritability, and totally independent of any influence derived from the nervous system. They are what may be regarded as independent contractions, and their object appears to be the exercise of a pressure from above downward on the fœtus toward the *os uteri*; these inherent contractions of the uterus will, occasionally, begin to develop themselves for several days, and even weeks, prior to the setting in of labor. They may, indeed, be regarded as preliminary to the concentrated effort, which results in the expulsion of the fœtus; and, no doubt, one of their purposes is, as it were, to prepare the uterus for the struggle, which is so close at hand.

If you ask for the proof of this independent contraction of the organ, I will refer you to two important facts, which establish beyond a peradventure that the uterus possesses a contractility of its own, in no way dependent upon nervous supply. The facts are these: 1. The fœtus has been expelled, in virtue of the inherent contraction of the organ, after the death of the mother, when nervous force was out of the question; and it is also well established that the peristaltic movement will continue for some time after life has become extinct.† 2d. Parturition has been accomplished by

^{*} The terms “*insensible contractions*” are not strictly correct. So far from being *insensible*, they are not only felt by the mother, but oftentimes give rise to more or less distress. They should rather be called *independent* or *inherent*.

† De Graaf has, in dissected rabbits, observed the womb to be agitated by a fluctuating and peristaltic motion, and by its own force to drive out the fœtus. [De Mulier. Organ. p. 325.]

the unaided efforts of nature in cases in which the lower portion of the spinal cord has been completely destroyed; you will see it go on, too, in women affected with paraplegia, showing that the cord is without function, and cannot, therefore, in these cases, minister to uterine contractions. Dr. Brown-Séquard* says he has seen, hundreds of times, the uterus or its cornua, full or empty, contracting to appearance spontaneously, after the death of rabbits and other animals, at a time when the spinal cord had entirely lost not only its reflex power but also the power of acting on muscles when directly excited by galvanism, warmth, or mechanically.

But, gentlemen, the question still presses us—what is the determining cause of labor, or what is it that first induces these independent movements in the muscular tissue of the uterus? I may not be very lucid in the exposition of my notion touching the question—but it does seem to me that there is a *necessary connexion between this first spontaneous movement in the muscular walls of the uterus*, and, if I may so term it, a *matured development of the muscular structure of the organ itself*. What I mean by *matured development* is this—from the instant of fecundation the uterus becomes an active centre, the effect of which is an increased nutrition, which results in the growth and development of the various structures composing it. This increase constitutes one of the processes in the interesting scheme of reproduction—and so essential is it that, when interrupted, failure on the part of nature to consummate the act of generation is the consequence. The gradual and successive development of the muscular tissue of the gravid womb has, I think, a marked bearing on the point now under consideration. Here, be it remembered, we have this important character of structure, during the period of gestation, constantly receiving, through increase of nutrition, increase of volume, and consequently augmented ability for the manifestation of its peculiar function—contractility. If you consider, on the one hand, this fact of increase in development, and, on the other, the interesting circumstance that, as pregnancy approaches its termination, the uterine muscular fibre is, as a necessary result, proportionately gaining in maturity of growth and development—if, I say, you consider all these things, does it not seem within the range of probability that, under the constant influence of nutrition, and repose, so far as regards its functional display, the muscular tissue of the gravid uterus becomes, as it were, surcharged—in a word, so full of contractile power that, in perfect consistency with the general laws regulating the animal economy, it commences its series of acts through which alone the exit of the fœtus, after full intra-uterine development, can be accomplished.

* Experimental Researches applied to Physiology and Pathology, p. 105.

If I be correct in my exposition of the determining cause of labor, which I have thus briefly presented, it seems to me it must be admitted that the *primum mobile* of uterine action, when gestation has been completed, is a physiological necessity. Under any circumstances, whether the theory be substantial or otherwise, it will, I think, prove not less satisfactory than the opinion of Avicenna—"That at a fixed time, labor takes place by the grace of God."

Fatty Degeneration and other Changes in the recently delivered Uterus.—It is conceded that the uterus, as soon as its contents have been expelled, exhibits new changes in its elementary constitution—the blood-vessels and nerves which, during gestation, were largely developed, now diminish in volume, and soon not a vestige can be detected by the naked eye: the muscular tissue becomes much less considerable, through the diminution, both in size and number, of its elements—the musculo-fibre cells—and passes into a state of fatty degeneration,* so well demonstrated by Virchow and Kilian. In a word, the organ becomes invested again with a rudimentary character, which continues until stimulated to new formations, and a more perfect organization by pregnancy.

Fatty degeneration, or substitution, is very frequently a morbid or pathological condition—but is it always so? Evidently not—for it is sometimes a perfectly natural result, as is shown in certain structures prior to absorption, when they have accomplished the term of their functional activity. This is well illustrated in the placenta, as has been pointed out by Dr. Druitt, Dr. Robert Barnes, and other observers. The vessels of this body—the placenta—undergo fatty degeneration toward the close of gestation; the remarkable and interesting fact is, that this metamorphosis of structure commences in the tufts or vessels at the circumference of the organ, at which point its special office or function ceases first. This, then, I hold to be strongly corroborative of the opinion I have advanced. Fatty substitution, both of the placenta and of the muscular tissue of the uterus, takes place as soon as these structures have performed their particular part in the reproductive act; and this change in the tissues is not to be regarded as a pathological result, but as one of the natural processes of the economy.

* Dr. Priestley says, "He has occasionally seen at the post-mortem examinations of women who had previously borne children, the uterine tissue affected by fatty degeneration, and so soft and friable that a sound passed into the uterine cavity, during life, as a means of diagnosis, might have readily been pushed quite through the uterine walls, unless the greatest care were exercised in its manipulation." [Lectures on the Development of the Gravid Uterus, p. 103.]

LECTURE XXIII.

Seat and Origin of the Expulsive Forces in Parturition—How these Forces are Modified—Spinal Cord—Its Influence—Parturition in part an Excito-motory Act—Excitors of Reflex Action in the Uterus—What are they?—Difference in Uterine Contraction due to Inherent Irritability and Nervous Force—What is it that causes the Diaphragm and Abdominal Muscles to Contract as a Secondary Aid in Labor?—The Contraction of these Muscles is not always an Act of Volition; it is sometimes Reflex—Signs of Labor—Importance of—The Signs of Labor divided into Preliminary and Essential, or Characteristic—What are the Preliminary?—What the Essential Signs?—Labor Pain, how Divided?—Is Pain the Necessary Accompaniment of Parturition?—What is the true Explanation of Labor Pain?—Is it identical with Uterine Contraction, or is it the Result of Contraction?—Change in the Physical Condition of the Uterine Muscular Fibre under Contraction; Deduction—True and False Labor Pain; how Discriminated—Dilatation of Os Uteri; how Produced—Rigors and Vomiting during Dilatation; What do they Portend?—The Muco-Sanguineous Discharge during Labor; how Produced—Formation and Rupture of the “Bag of Waters;” how the Formation is Accomplished—Uses of the “Bag of Waters” during Childbirth—Caution against its Premature Rupture—The “Caul or Hood;” What does it mean?

GENTLEMEN—Having endeavored to explain the determining cause of labor, it is now proper to discuss the seat and origin of the expulsive forces, which result in the delivery of the fœtus and its appendages. These expulsive forces may be divided into two kinds: 1. The primary or efficient; 2. The secondary or auxiliary. You must recollect that the peculiar something which constitutes the inception of uterine action, is a very different thing, as a general principle, from the power through which is accomplished the evacuation of the uterine contents. The fact is generally conceded that the primary or efficient element of this power resides in the organ itself, and consists of the contractile efforts, which manifest themselves at the commencement of parturition, and continue with more or less impulse until the delivery is consummated. There is a striking difference in the grade and measure of force exercised by the contracting uterus upon its contents, and this difference will be fully recognised as the labor progresses. At first, and until the neck of the organ becomes so dilated as to experience the direct pressure of the presenting portion of the fœtus, the force is comparatively moderate, and is the result simply of the inherent mobility of the organ itself—an illustration of that independent *per se* contraction of which we have spoken in the preceding lecture. But as the labor advances, and when one of the consequences

of this advance—the dilatation of the os uteri—has been effected, then these moderate efforts undergo a marked and decided change—they assume an expulsive character, which increases in intensity in proportion as the head or presenting part of the fetus escapes from the uterus, and makes pressure on the walls of the vagina and vulva.

Difference in the Parturient Force.—It is not sufficient for you, as intelligent students, to know that there really exists a difference in the kind and amount of force exercised by the uterus during the parturient struggle—you require something more; you desire the explanation of this difference. Childbirth is, strictly speaking, a physiological act, and its physiology is of the most striking and positive nature. The spinal cord, that essential nervous centre, plays an important part in the general movement, resulting in the delivery of the fetus and its annexæ; and you cannot have your attention too steadfastly directed to this interesting fact. It is perfectly correct to say, that, as a general rule, labor is in part accomplished through an excito-motory influence, or, in other words, through reflex action. For the production of a reflex movement, two requisites are needed: 1. The spinal cord, which is the great central organ, and which becomes the recipient of impressions; 2. The incident excitor nerves, which, first receiving these impressions, convey them to the medulla spinalis, and this latter communicating to the motor nerves an increased vis or impulse, an influence is thus extended to the muscles to which these motor nerves are distributed, which results in a movement known, physiologically, as reflex.

Excitors of Reflex Uterine Action.—It is a matter of great practical interest to remember that there are various excitors of reflex action, so far as the uterus is concerned; and it is the recollection of this circumstance, which will enable you, oftentimes, not only to control morbid influence, but will be suggestive of important remedial agents in cases involving more or less peril, as in hemorrhage, inertia of the uterus, or excessive uterine contraction. Some of these excitors may be briefly alluded to: When a newly delivered woman applies her infant to the breast, it is not at all unusual for her to complain of more or less pain in the uterus—this is an example of reflex action, traceable as its primary cause to irritation of the excitor nerves of the mammae, the irritation being induced by the suction of the child's mouth. You are sometimes told that frictions on the abdominal surface, and more especially the application of cold, will evoke uterine contraction. The fact is undoubtedly so—and its explanation is found in the circumstance that the cutaneous or terminal excitor nerves of the abdomen become impressed by the friction or cold, and hence the reflex movement resulting in contraction of the organ. How precious to the life of your patient will be the recollection of this fact, in fearful hemorrhage of the uterus after the birth of the child—it is on the

principle just explained that you will, with such prompt and decided effect, use the cold-dash, which consists in throwing, with an impulse, a pitcher of cold water upon the abdomen. When everything looks dreary for the patient, and hope is almost abandoned from the failure of other remedies in these instances of alarming flooding, the cold-dash will, oftentimes, prove of incalculable service in closing up the flood-gates—the mouths of the utero-placental vessels—which are fast exhausting the strength of your patient, and hurrying her with rapid pace to the grave.

But, gentlemen, there are other important excitors of uterine action which are represented by the numerous terminal nerves distributed throughout the uterus and vagina, and these constitute the essential class of excitors in the parturient act, because, as soon as labor commences, they are brought more or less into operation, as will be presently shown. In addition, there are the excitors of the rectum and bladder, and hence you can understand why abortion will be apt to ensue in cases of constipation, or from the administration of drastic medicines, which act specially on this portion of the intestinal tube; and, also, from the tenesmus of dysentery. A similar result is equally susceptible of explanation when the neck of the bladder becomes the seat of irritation, either from the presence of a calculus, or from the absorption of cantharides after a blister has been applied, occasioning strangury.

We have spoken merely of what have been designated the eccentric or indirect influences which operate in the production of uterine contraction. It must, however, not be forgotten that there are certain centric or direct influences equally capable of bringing about the same result—influences which, instead of exercising their primary irritation on the terminal or incident excitor nerves, pass directly to the nervous centre itself—the medulla spinalis.

If, as I hope, I have succeeded, so far, in making myself understood, there will be no difficulty with the data just presented in comprehending the *modus operandi* of the two kinds of forces—the primary and secondary—which determine the expulsion of the fœtus and its appendages.

Primary Forces of Parturition.—The first contractions of the parturient womb are altogether due to the inherent, independent irritability of the organ; and, as has already been explained to you in the preceding lecture, this inherent action of the uterus will, under certain circumstances, suffice to accomplish the birth of the child—showing incontestably that childbirth is not essentially dependent upon nervous agency. These first contractions continue at irregular intervals, and their tendency is to aid in the dilatation of the os uteri. When this is accomplished, and even during the progress of dilatation, the contraction increases in force, and here we have a striking illustration of the conservative care and per-

fection displayed by nature in the great scheme of delivery. Prior to the full opening of the mouth of the uterus, extraordinary power was not needed; but, as soon as this stage of the labor has been completed, an increased force is called for; and it is immediately furnished by making the spinal system of nerves tributary to the wants of the economy. Hence, you will find, at this period of the parturient effort, that the irritation of the incident excitor nerves of the dilated os, caused by the pressure of the presenting portion of the fœtus, is instantly transmitted to the medulla spinalis, from which is derived a responsive impulse to the motor nerves of the uterus, resulting in increased energy of the contraction. In this way, you perceive, is explained the primary or efficient element of labor, which we have already told you is centred in the uterus itself, and which is of a two-fold nature: 1. Inherent, the result of simple muscular irritability; 2. Nervous, the result of reflex action.

Secondary Forces.—Let us now turn to the secondary or auxiliary forces of childbirth, and see, in the first place, what they are; and secondly, the *modus in quo* of their production. These auxiliaries consist in the powerful contractions of the diaphragm and abdominal muscles, which undoubtedly, although in a secondary manner, render good service in the work in which nature is engaged. As soon as the head or presenting part of the fœtus has fairly escaped through the mouth of the womb, it necessarily exercises a positive pressure on the distended vagina—it is the pressure on this surface, which chiefly induces irritation of the incident excitor nerves, and hence, through reflex influence, the diaphragm and abdominal muscles are awakened to powerful contractions.* When these latter commence, the labor undergoes a marked change—it is then what is denominated *expulsive*, and every succeeding contraction of the organ is characterized by an increased impulse. The will frequently has no control at this time over the muscular contractions of the diaphragm and abdominal walls—they appear independent of volition, nor can they, under full development, be restrained. They are, under these circumstances, like deglutition and many other phenomena which are dependent upon a special local irritation, under no subjection to the individual. How do you suppose the act of deglutition is accomplished? Is it a voluntary movement! You can easily satisfy yourselves that it is not, for you will attempt in vain to swallow by any voluntary act of your own. Deglutition is a phe-

* I think it right to say that, although the contraction of the diaphragm and abdominal muscles is sometimes reflex during the parturient effort, yet it is quite certain that it is frequently voluntary. One of the most formidable troubles with which the medical man has to contend is involuntary action of the diaphragm, because it gives rise to spasms, more perilous than any other, inasmuch as their direct tendency is to arrest the respiratory movement.

nomenon due to reflex action; its source is the *medulla oblongata*; and irritation of the excitor nerves of the fauces is an essential prerequisite to its performance. The food, during a repast, is the usual irritant, and under ordinary circumstances the contact of the saliva with the fauces enables you to consummate the act. So you perceive, physiologically speaking, deglutition, so far from being ranked among the voluntary phenomena, is essentially and truly *automatic* in its nature.

From what has been said in explanation of the primary and secondary causes of labor, you cannot have failed to observe one cardinal feature, viz. that the forces, necessary to the expulsion of the fetus, commence at first in moderation, and, as the labor advances, they are characterized by vastly increased impulse and vigor. You not only understand that this is so, but you are also prepared to appreciate its necessity. Of course, gentlemen, you must bear in mind that I am now speaking of parturition under ordinary or normal circumstances, and not of those exceptional cases in which the effort commences with extraordinary violence, and is completed in a very brief period.

Signs of Labor.—The next topic for our consideration will be the signs of labor, and here, permit me to suggest, we touch upon a most important subject for the student and practitioner of midwifery—a subject, which if not wisely understood, will frequently lead to serious embarrassment, if, indeed, it do not subject the medical man to just and withering rebuke. How, for example, are you to know that labor is at hand, or has really commenced, except through a proper appreciation of the signs, which indicate either its approach or presence? It is a question altogether of testimony, and that testimony is made up of signs or indications. It is for you, therefore, to be careful in your analysis of these signs; see that you do not confound true with false evidence. For practical purposes, the signs of labor may be classified under two divisions, and I think they will embrace everything, which it is important for you to know on the subject: 1. The preliminary or precursory; 2. The essential or characteristic.

Preliminary Signs.—The preliminary indications of labor consist of certain phenomena, which usually exhibit themselves a few days previously to the commencement of the parturient act, and they may, in the true sense of the term, be considered as preparatory. They are as follows: 1. When labor is near at hand, the fact will be broadly indicated by the peculiar condition of the neck of the uterus; it will have lost its length—it will be more or less circular—in a word, the neck of the organ will be obliterated; on an examination per vaginam there will be recognised a simple orifice, which, in women who have already borne children, will usually be sufficiently dilated to permit the introduction of the end of the index

finger, while in the *primiparæ* there will, as a general rule, be an absence of dilatation. 2. For some days, and occasionally for two or three weeks prior to the commencement of actual labor, the female will complain of a sense of uneasiness about the uterus; and this uneasiness will probably be observed several times during the day and night; if, while the patient complains of this local disturbance, you should place your hand over the region of the womb, you will distinctly perceive that the organ becomes hard for the time being, and as soon as the uneasy sensation passes away, it again becomes relaxed. These are what are known as the independent contractions of the uterus, and generally develop themselves earlier in the *primipara*. They are not accompanied by a bearing-down so characteristic of true labor contractions; they are, on the contrary, but the result of the muscular irritability of the organ, and are to be regarded as simply preliminary. Be careful, and do not confound this early action of the uterus with labor properly so called. The sense of uneasiness, due to these independent contractions, will sometimes occasion much anxiety in the mind of your patient; she regards it as the harbinger of evil, and looks upon it as an evidence that something is wrong. It will be your duty at once to dispel all apprehension, and assure her, which you can do with entire truth, that the greater this local disturbance previous to the commencement of the parturient effort, the more auspicious will be the delivery. This is really so, as a general rule, for these contractions of the gravid uterus are not only preliminary, but, when of a decided character, exercise a very happy influence in preparing the os uteri for its subsequent dilatation. Indeed, I have remarked, as a practical fact worthy to be recollected, that, all things being equal, labor will be shortened and more favorable just in proportion to the activity of these contractions. 3. For some days previous to the completion of gestation, there will be a remarkable change in the position of the impregnated uterus; and this change, as you will presently see, will result in what may be termed mixed phenomena—some highly favorable to the condition of the female; others, again, entailing upon her for the time being, more or less distress.

The change to which I allude in the position of the organ is this—the fundus of the womb, in lieu of pressing high up in the epigastric region, is observed to descend. This is what may be termed the *righting* of the organ; it is, as it were, the placing itself in readiness for the struggle in which it is so soon to engage. If you ask me why the gravid uterus descends in the abdominal cavity previous to the commencement of labor, I must acknowledge that I cannot satisfactorily answer the interrogatory in any other way than by referring the descent to a combination of influences, such as increase in the weight of the organ, and of the fœtus,

liquor amnii, etc., together with a softening of the fibro-articular tissues.

Be the explanation as it may, the immediate effects of this descent of the uterus require a word of comment. In the first place, when the organ descends into the abdominal cavity, the pressure of the fundus being removed from the diaphragm, the female feels much lighter and more buoyant; she can breathe free, and is relieved from the sense of oppression which she had previously experienced. Secondly, the abdomen becomes much less protuberant, especially in the epigastric and umbilical regions. Let me here, for a moment, call your attention to some of the temporary inconveniences of this alteration in the position of the uterus. Just in proportion as the fundus descends will be the measure of descent of the opposite extremity of the organ into the pelvic excavation; the os uteri, which before was high up, and difficult to be reached, is now much more accessible to the finger; the neck of the bladder undergoes more or less pressure from the presenting part of the fœtus, giving rise to irritation and frequent desire to micturate, and sometimes occasioning a retention of urine. The rectum may be unduly irritated by the superincumbent weight of the prolapsed organ, and hence distressing tenesmus may be the consequence. The vagina itself does not escape the effects of this descent of the uterus, and one of the results will be, through irritation of its walls, a more or less profuse discharge of mucus.

In addition to what have just been enumerated as among the precursory signs of labor, may also be named the following:—hemorrhoidal tumors, increased œdema of the lower limbs, with an increase, also, in the venous engorgements, all these being more or less the necessary consequence of the pressure of the gravid womb after its descent into the pelvic cavity. Nor should I omit to mention, among the indications preliminary to the advent of labor, various neuralgic pains about the hips and loins; and you will not fail to notice in some cases, especially when the presenting portion of the fœtus has thus early, as it sometimes will do, passed low down into the pelvic excavation, that the female will complain of a sense of numbness in her lower limbs, with occasional inability to move them with the usual alacrity—threatening, indeed, their entire loss of power, or paraplegia. This condition of things will necessarily give rise to much alarm, and it will be your duty to explain to the patient, not only the cause of these neuralgic pains, and of the menaced paraplegia, but also to assure her that both one and the other will be evanescent in their character, and are simply the results of the pressure of the prolapsed uterus and its contents against the sacral and other nerves of the pelvic canal.

In some females, you will remark the exhibition of great anxiety—accompanied by remarkable depression—a short time before the

setting in of labor. They will become extremely nervous and irritable, and it will require, on your part, sound judgment in your appeals to their good sense not to cherish feelings of despondency. I have generally observed that this depression usually manifests itself in women of a naturally morbid irritability, and it is important to control it, as far as may be, because, beyond certain limits, it may exercise a prejudicial influence on the confinement.

Such, gentlemen, are some of the more notable of the indications which precede the commencement of labor, and which, therefore, have with much propriety been denominated preliminary or precursory. You must not, I repeat, confound the vesical irritation, or the tenesmus, or the increased discharge of mucus from the vagina, which are but the effects of mechanical pressure, with morbid conditions of these organs. Suppose, for example, a married lady should send for you a few days before her confinement, and say to you, "Doctor, I am very much alarmed about myself; I am afraid I have some serious disease of the bladder." "Why do you think so, madam?" "Because, sir, for the last few days I have had so much irritation in that part; I have a more or less constant desire to pass water." Now, gentlemen, it would be a very foolish thing, to use a mild expression, to mistake this irritation of the bladder—simply a premonitory symptom of approaching labor—for disease of the organ, and hence subject your patient not only to useless, but, very probably, mischievous medication. Nor, if another lady complain of distressing tenesmus, must you hastily conclude that she is afflicted with dysentery, and therefore place her on the sick list, and convert her innocent and unoffending stomach into a veritable drug shop, for a malady which exists only in your own imagination. You must pardon me for calling your attention to these matters, but I am most anxious that you should, when you enter on the mission of duty, be able to trace effects to causes, and thus distinguish between the shadow and the substance. In these cases, the irritation of the bladder and rectum, like the neuralgic pains and threatened paraplegia—all results of a common antecedent—will disappear as soon as that antecedent, through the termination of delivery, has been removed; and so you must tell your patient. She will find you a true prophet, and consequently her faith in your skill and judgment will be greatly enhanced.

Essential Signs.—The *essential* or *characteristic* signs of labor are four in number: 1. Pain; 2. Dilatation of the mouth of the womb; 3. A muco-sanguineous discharge; 4. Formation and rupture of the membranous sac, or "bag of waters." These four phenomena constitute the elements of labor; and do, in fact, make up its diagnosis. When they are present, parturition is undoubtedly in progress, and hence they are properly named its characteristic indications.

1. *Pain*.—Under ordinary circumstances, pain is the inevitable penalty of childbirth. "In sorrow shalt thou bring forth," is the decree of Heaven, and it has always seemed to me that the suffering entailed upon the parturient woman but tends to strengthen and consolidate the undying love she cherishes for her offspring. The progress of science, through the application of anæsthetics, has, it is true, to a great extent, emancipated the lying-in chamber from the anguish incident to it, but it may be a question whether this interference with the rôle of nature has not, oftentimes, been productive of serious consequences. That the employment of anæsthetic agents, notwithstanding their undoubted value under judicious administration, has been sadly abused, will, I think, be conceded by every unprejudiced mind. But this is a subject upon which we shall have something to say in a succeeding lecture.

Are the Pains of Labor, and the Contractions of the Uterus Identical?—Those of you who have ever attended a case of labor, and witnessed the intense agony of the woman, will, perhaps, express more than ordinary surprise that certain authors should have endeavored to show that the process of childbirth is not one of suffering. It is nevertheless true that such demonstrations have been attempted, but to my mind they have failed most signally in their proof. Again: even among those, who admit one of the characteristic attributes of the parturient effort to be pain, there is much discrepancy of opinion as to the peculiar manner in which the pain is produced. Some writers, and, indeed, they constitute the great majority, maintain that the contractions of the womb, and the pains of labor are identical—but this, I think, is an error, and has, no doubt, led to some of the confusion which exists on this subject. So far from the contractions of the uterus and the pains of labor being one and the same thing, I shall endeavor to prove to you—and I hope I may succeed in the development of the opinion—that labor pains are the direct consequences of the contractions, and that they hold to each other the relation of effect and cause. One of the essential conditions in support of this hypothesis is, that the contractions must precede the pain; and do they not? Let us, for a moment, examine this question.

Suppose you are attending a case of labor, which has fairly commenced—what do you observe? Your patient, who may have had several severe pains, will, perhaps, be in pleasant conversation with you, when suddenly she will exclaim, "Oh, there, doctor, I am going to have another pain." Properly translated, what is the true import of this language? Why, it means simply that the patient becomes cognizant of a movement in the uterus, which is nothing but the incipient contraction, and experience has admonished her that this movement or contraction of the organ will immediately be followed by the pains of labor. Again: place

your hand on the abdomen of the patient in whom parturition has commenced, and you will, by a few seconds, anticipate the coming on of a pain, because you feel the uterus harden under your hand; or, with the finger introduced into the vagina, you will know that a pain is about commencing the moment you feel the neck of the womb stiffening, if I may so term it, in response to the contractile effort. There is no speculation here; it is a matter of fact, which you can ascertain for yourselves in the very first case of labor which may present itself to your observation—showing conclusively that the contraction precedes the pain—the former being the cause, the latter the effect.

But, I can readily imagine you to say—well, for argument's sake, sir, we accept the hypothesis that uterine contraction and labor pain are not identical, and are truly cause and effect. This admission, however, you properly urge, does not explain to us how the contraction produces the pain. Well, gentlemen, I shall now endeavor to satisfy you on this point. In the first place, you must bear in mind that the object of the contraction of the gravid uterus is to afford an exit to the fœtus and its appendages; and, in order to accomplish this end, there must of necessity be an opening made by these contractions in some portion of the organ, through which the escape of the fœtus may be effected. It is the dilated os uteri which constitutes this opening, and the dilatation is mainly accomplished by the contraction of the longitudinal muscular fibres, which pass from above downward parallel to the long axis of the organ, and which, therefore, concentrate their whole force upon a given point,* viz. the mouth of the womb. When these longitudinal fibres contract, as a necessary consequence of that contraction, their previous physical condition undergoes two important changes: 1. They shorten in their long axis; 2. They increase in volume in their respective diameters. This increase in the diameters is, of course, the necessary result of the diminution in the length of the fibre.

What, therefore, I desire especially to direct your attention to is this: When the respective muscular fibres of the gravid womb undergo this augmented volume, they must, as a consequence, exercise, for the time being, an unusual pressure on the nerves distributed throughout this very muscular tissue; and it is this pressure which, I believe, in part, satisfactorily explains the phenomena of labor pain. When the contraction ceases, the pain ceases, for the reason that, in the absence of the contraction, the nerves enjoy

* The fundus of the gravid womb undergoes a more marked development than any other portion of the organ; and if in addition to this fact, it be recollected that the longitudinal muscular fibres exist in greater abundance there, it is easy to imagine the feeble resistance offered by the cervix, which is not only less developed, but more sparingly provided with muscular tissue.

an immunity from pressure. While, therefore, I am disposed to think that this, to a certain extent, is the true exposition of labor pain, yet I am inclined to adopt, in connexion with the theory of pressure, the views propounded by Dr. Brown-Séquard on this question. He maintains that the pain is partly due to the galvanic discharge caused by the muscular fibres under contraction, *and when they meet with resistance*. It is the irritation of the sensitive nerves of the uterus, under the influence of that discharge, which he regards as a principal cause of the pain.*

However, as labor advances, the increase of suffering can be traced to other sources. Such, for example, as the pressure of the foetal head against the os uteri during the process of dilatation; and, when the head has passed the mouth of the organ, its pressure on the walls of the vagina and outlet are additional causes of distress; add to this the irritation which the various pelvic nerves undergo from compression during the egress of the child, and you will at once see that the necessary consequence will be enhanced suffering, the susceptibility to which will depend much on the peculiar temperament of the individual.

Division of Labor Pains.—Authors have divided labor pains into true and false; and this distinction it is important for you, as practitioners, clearly to appreciate. True pain is the offspring of uterine contraction; in other words, it is synonymous with the existence of labor. False pain, on the contrary, has no connexion whatever with any movement of the uterus, and is the product of some cause entirely foreign to uterine contraction. It may be occasioned by flatus in the intestines, indigestion, diarrhoea, constipation, disease of the kidneys, distension of the bladder, rheumatism of the uterus or adjacent muscles.

There are few things, gentlemen, more essential for the accoucheur than a just and prompt discrimination between the true and spurious pains of labor. Without an accurate diagnosis on this point, he will be like the ship without its rudder; his progress will not only be uncertain, but will be unsafe, and sometimes, indeed, disastrous. How, for example, without the ability to distinguish between these two grades of pain, can you know, when summoned to the sick-room, whether or not your patient be in labor? Failure in this particular will lead to much embarrassment, and oftentimes prove perilous, if not destructive, to your reputation.

True Labor Pains.—These pains, remember, are always connected with the contraction of the uterus, and are slight and almost imperceptible at the beginning of labor. They are first felt in the back, and usually pass on to the thighs; they are distinctly recurrent—that is, they are not continuous—but come on at intervals.

* London Lancet. 1857.

They may be divided into two kinds—grinding or cutting pains at first; after the os uteri has advanced in its dilatation, they assume a bearing down or forcing character. When the true pain is present, the entire area of the uterus becomes hard; and this change in its condition can readily be recognised by placing your hand on the abdomen. As soon as the pain subsides, the hardening of the uterus is followed by relaxation; again: if during the pain the finger be introduced into the vagina, and the os uteri dilated, the membranes will be felt slightly protruding, in response to the pain, and they will present to the finger a sense of resistance; but with the discontinuance of the pain they cease to protrude, and become flaccid. Besides these characteristic evidences of true labor pain, the patient, during its presence, will manifest her sufferings by suppressed groans, or in some more marked way. As soon, however, as the pain has passed, she will not only be free from distress, but will join in agreeable conversation with you.

Spurious, or False Pains.—These, as I have already remarked, are not connected with any action of the uterus; for during their existence the organ will be in a state of entire tranquillity. They are more or less continuous, depending on the special cause which may produce them, and are, therefore, not recurrent. It can scarcely be necessary for me to observe that these pains can only effectually be removed by tracing them to their proper source. For example, if from constipation or indigestion, aperients will be indicated. Should they be due to spasmodic action, or, as sometimes will be the case, to excessive fatigue, a gentle anodyne, in some form not inconsistent with the idiosyncrasy or peculiarity of your patient, will prove the remedy. These pains will not unfrequently be the result of superabundance of acid in the primæ viæ; what better, under the circumstances, than the employment of antacids? It may also happen that inflammatory action or febrile excitement has evoked this character of pain. General or local bleeding, with a judicious resort to purgatives, diaphoretics, etc., will constitute in these cases the elements of relief.

II. *Dilatation of the Os Uteri.*—The doctrine has prevailed, and indeed it has among its supporters some clever names, that the mouth of the womb is opened by the fetus itself—that this latter, as it were, under the influence of a peculiar instinct, desires to be liberated from its accommodations, and therefore spontaneously, and upon its own responsibility, makes a passage for its escape. It cannot be necessary to demonstrate the fallacy of this proposition—its absurdity must be apparent to all of you. We, consequently, are to seek for some other explanation of the true cause of the dilatation, which is so essential to the completion of labor. You must remember that the cervix of the uterus is well supplied with circular muscular fibres, and, as a general rule, they exercise a

species of guardianship over this particular portion of the organ. Were it not for them, constituting as they do, a veritable sphincter, the closure of the *os* would be imperfectly maintained. But as the object of labor is the expulsion of the fœtus, there is a necessity for an opening of the mouth of the uterus, and consequently a temporary surrender of the rigidity of these circular fibres. When the uterine contractions commence, the longitudinal muscular fibres are thrown into action, the result of which is a concentration of force, directed from above downward, falling on a common point or centre—the *os uteri*.

The only resistance to this force will be the circular fibres. Through successive efforts, however, these yield to the more powerful impulse of the longitudinal fibres, and the result is dilatation. Muscular contraction, therefore, may be regarded as the primary or efficient cause of the dilatation of the *os uteri*; but there are also two secondary or auxiliary causes, which exercise their influence. The first of these is the "bag of waters;" the second the fœtal head. For example, when the dilatation has fairly commenced, the membranes with the liquor amnii will be forced through the opening, and, thus protruding, will exercise a uniform and gentle pressure against the orifice. When the "bag of waters," through successive contractions, is ruptured, and the amniotic fluid escapes, then the head itself, by its pressure, forms a kind of wedge, which, acted upon by the contractions of the longitudinal fibres, contributes its part to the required dilatation.

If proof be required that this is the process through which the opening of the mouth of the gravid womb is accomplished, you will find very substantial evidence of the fact in cases in which there is a marked want of parallelism between the long axis of the uterus and the axis of the superior strait of the pelvis. For instance: if there should be ante-version, retro-version, or a right lateral or left lateral obliquity of the organ, the consequence would be that the *os*, instead of corresponding more or less with the centre of the pelvic excavation, would present its anterior surface backward, forward, or laterally. In such case, the force of the contractile effort of the longitudinal fibres would lose its concentration, and consequently the dilatation would be greatly retarded, if, indeed, it were not altogether prevented. We shall, however, have occasion to allude to these malpositions of the uterus, as connected with childbirth, in a future lecture. There is one important and material point, in a practical view, which you should not lose sight of, as regards the dilatation of the *os uteri*, and it is this: in the primipara it is much more tardy than in women who have already borne children; and again, as a general principle, a longer time is required to effect an opening the size of a four-shilling piece than for the completion of the entire process.

Here, allow me to remind you that, during the progress of dilatation, the female is not unfrequently attacked with *rigors* or *shivering fits*, as they are sometimes called. These rigors should create no alarm when they are simply the product of uterine contraction; on the contrary, I am disposed rather to regard them as favorable indications. You may, under the circumstances, administer warm tea or gruel, and assure your patient that she need feel no anxiety. But, gentlemen, there is another species of *rigor* in the lying-in room, which is not so innocent, and which may be the prelude of trouble. I mean those distressing chills, which sometimes occur in very protracted labors, and which are accompanied with furred tongue, excessive thirst, oppressed breathing, and a hard and accelerated pulse. These are usually rigors of danger, and will require all the vigilance of the accoucheur. They point to serious inflammatory action.

The same observation applies to the vomiting which occurs during labor. It is not unusual for women to be affected with "sick stomach" during the stage of dilatation. This is regarded as a most favorable circumstance; it portends no evil, but, on the contrary, it renders a material service through the relaxation it produces, thus facilitating, among other things, the opening of the mouth of the womb. There is, however, another kind of vomiting, which will occasionally manifest itself after a long and tedious labor; and unfortunately it is but too often the precursor of death. Such is the vomiting, which occurs after or before full dilatation of the os uteri, with a suspension or entire cessation of contractions—a feeble and rapid pulse, great pain on the hand pressing the abdomen, a sunken countenance, with extreme pallor, and cold perspiration. This is the vomiting indicative of rupture of the uterus, one of the most alarming, because one of the most fatal of the contingencies of the lying-in chamber.

III. *A Mucous-Sanguineous Discharge*.—Another of the ordinarily characteristic signs of labor will be this discharge from the vagina; but it will sometimes happen that there will be an absence of the discharge during the parturition, and this is known as a "*dry labor*." The mucous secretion is derived from the numerous little follicles in the cervix and vagina. It is poured out usually in great abundance at the close of gestation, and at the commencement of parturition. It is intended to answer a most important object—the relaxing and lubricating the parts, thus facilitating the approaching distension. Commonly, there is commingled with this secretion of mucus a slight tinge of blood, and it is known as the *show*. Some women will have this *show* several days before labor commences. The blood probably comes from rupture of the more minute vessels of the uterine orifice.

IV. *The Formation and Rupture of the Membranous Sac, or*

Bag of Waters.—When describing the appendages of the fœtus, and their relation to the uterus, you will remember I told you that the most internal of the membranes is the amnion, and that this incloses a fluid—the liquor amnii—in which the fœtus, as it were, floats. One of the first effects of the contraction of the uterus will fall upon the amniotic fluid; but as, from its very nature, this fluid is incompressible, and consequently its volume cannot be diminished, the impulse it receives from the contracting womb forces it to some point of the organ which presents the least resistance to its escape, and this point is the os uteri. As soon, therefore, as the latter begins to dilate, there would be no obstacle to its exit, were it not that it is inclosed in the membranes. These membranes constitute a sac for the amniotic liquor; and, in proportion as the os uteri dilates, the lower portion of this sac, distended by the liquor amnii, protrudes. Under contraction it becomes hard and resisting; in the interval, on the contrary, it softens, and slightly recedes. This sac, as has already been stated, by its gentle and uniform pressure, assists materially in dilating the mouth of the womb; and you will observe in practice, that when the os uteri is sufficiently open to allow the head of the fœtus to pass, the sac becomes spontaneously ruptured. It will sometimes, however, occur that, owing to inordinate resistance of the membranes, it does not rupture. In such cases, when the os uteri is fully dilated, longer to respect its integrity would only be a useless protraction of the labor; and therefore it will be your duty to proceed at once to effect its rupture, which may be done by pressing the point of the index finger against the centre of the sac during a contraction. This, however, will not always answer, and I have occasionally been obliged to open the bag by grasping a fold of it during the interval of contractions, between the thumb and forefinger. I have, indeed, met with cases in which it became necessary to pierce the sac with the point of a bistoury. But this needs caution for fear of injuring the fœtus or adjacent soft parts.

The practical fact which I have just mentioned, that there is, generally speaking, a spontaneous giving way of the “bag of waters” as soon as the mouth of the uterus is sufficiently dilated to allow the head of the child to pass—is one full of interest, and should admonish you against an officious intrusion on the laws of nature. How often, for example, is a labor made protracted, and, as a consequence, the mother’s strength exhausted, and the life of the fœtus endangered, through the officiousness of the accoucheur in prematurely rupturing the sac. In doing so, an escape is afforded to the waters before the necessary dilatation is accomplished, thus entailing upon the female much unnecessary suffering, and involving both her and the child in more or less peril. It should be recollected, as a sound maxim in midwifery, that *to rupture the mem-*

branes, except in certain cases which will be mentioned hereafter, before the os uteri is fully dilated, is bad practice. Let us examine this point for a moment. When the sac is ruptured, of course the amniotic fluid in more or less quantity escapes—therefore, in this premature rupture, and consequent loss of the fluid, nature is deprived, in the first place, of an important auxiliary in accomplishing the dilatation of the os; and secondly, as there is little or no fluid left in the womb to interpose between the uterine walls and fœtus, the latter will be exposed more or less to undue and protracted pressure; in this way the umbilical cord is in danger of compression, thus interrupting the fœto-placental circulation, and consequently leading to the destruction of the child.

In certain cases, you will meet with an exceedingly unyielding os—it will give but slightly, and the membranes will protrude in a conoidal form, stretching down in this peculiar shape to the vulva itself. Be careful not to be deceived under these circumstances—do not mistake this abnormal form of the sac for one of the extremities of the child, an error which has been committed, and which can only be avoided by a proper degree of caution. Finally, the child will occasionally come into the world with a portion of the membranes over its head—this is known as the caul or hood, and is regarded by the ignorant as a circumstance most auspicious to the future of the child, for it is supposed that the caul is a certain precursor of the high destiny of the little stranger. It cannot be necessary to say that such an opinion is but the offspring of superstition, and, like many other things, has no foundation but in ignorance and morbid imagination.

LECTURE XXIV.

Natural Labor: Conditions for—What is required on the part of the Mother; what on the part of the Fœtus—Hippocrates and Head Presentations in Natural Labor; Fallacy of his Opinion—Face Presentations in Natural Labor; Mechanism of—Diagnosis of Face Presentations; may be Confounded with Presentations of the Breech—Face Presentations in Dublin Lying-in Hospital—Error of Writers with regard to Version and Forceps Delivery in Face Presentations—Presentation of the Pelvic Extremities; the Breech, Feet, and Knees—Opinion of Hippocrates; his Direction for bringing down the Head in these Presentations—The Practice of A. Petit, Boucher, and others—Presentation of the Pelvic Extremities and Natural Labor—Dr. Churchill's Statistics—Statistics of Dr. Collins; Deduction—Dr. Hunter on Management of Breech Presentations—Diagnosis of these Presentations; may be Confounded with those of the Shoulder; Prognosis—Are Breech Presentations necessarily Destructive to the Child?—Do they in any way Compromise the Safety of the Mother?—Mechanism of Breech Presentations—Presentation of the Feet; Diagnosis and Mechanism of—Presentation of the Knees; Diagnosis and Mechanism of.

GENTLEMEN—Labor, to be natural, necessarily presupposes the existence of certain conditions; and it is, therefore, proper, that we should now examine in what these conditions consist. Some of them refer to the mother; others' to the fœtus.

I. On the part of the Mother.—The pelvis must be well conformed, exhibiting a capacity sufficient for the exit of the child; the mother possess strength adequate to the wants of the delivery; the gravid uterus parallel, or nearly so, to the axis of the superior strait; the os uteri, vagina, and vulva sufficiently yielding to the forces of expulsion; and these latter should possess the requisite degree of efficiency. It must be quite evident to you that these conditions are essentially material to the accomplishment of delivery by the unaided efforts of nature. For example, if the pelvis be so diminished in size as to render it physically impossible for the child to pass, the interposition of art will be called for, and therefore, in such case, the labor ceases to be natural; so it is with the other prerequisites. How, for instance, could the expulsion of the fœtus be effected by the resources of nature, if the uterus, instead of being in its long axis parallel, or nearly so, to the axis of the brim, should be in a state of ante-version, retro-version, or exhibit a decided right or left obliquity? In either of these malpositions of the organ, the cervix, in lieu of regarding the pelvic cavity, would be turned toward the sacrum, symphysis pubis, or to one or

other of the lateral walls of the pelvis, so that the whole force of the uterine effort would be negative in its influence, because of the resistance of the bony structure of the pelvic canal.*

II. *On the part of the Fœtus.*—The fœtus, in its parent's womb, is doubled upon itself in such way as to preserve an ovoid form; this ovoid is divided, for practical purposes, into the superior and pelvic extremities—the superior embracing the head—while the pelvic extremities include the breech, knees, and feet. It is, therefore, necessary, in natural labor, that one of the extremities of the ovoid should be present, viz., either the head, breech, knees or feet. In either of these presentations, all things being equal, or, in other words, in the absence of any complication, the resources of nature will be adequate to accomplish the delivery. I am aware that the presentation of the pelvic extremities is usually regarded as preternatural, calling for the interference of the accoucheur; and this latter opinion, I am sure, has often led to hasty and unnecessary action, resulting frequently in disaster to the child, and more or less injury to the mother.

The idea that, in natural labor, the head must present, is a very ancient one; it originated with Hippocrates himself. The Father of Medicine very aptly illustrated the relation of the fœtus to the womb by comparing it to an olive in a long-necked bottle. He said, that in order to afford escape to the olive one of its extremities must present. This is perfectly true, and applies with equal force to the exit of the fœtus. But, strange to say, with all the truthfulness of the comparison, he taught that for the child to be expelled by the unaided resources of nature, consistently with the safety of both mother and fœtus, an essential prerequisite is—that its head should present at the superior strait.* The authority of the illustrious Father of Medicine on this question has not been without its effect; it has introduced bad practice into the lying-in chamber; it has caused the accoucheur to be officious, when he should trust to nature—it has, in a word, inducted him to a “meddlesome midwifery” in all cases of pelvic presentations; for, under the conviction that this presentation is contrary to nature, he has, as soon as he ascertained its existence, proceeded by ill-advised efforts to terminate the delivery.

* These obliquities of the organ may often be corrected by change of position on the part of the female, or through the skilful manipulation of the accoucheur; and whenever they exist so completely as to embarrass delivery, prompt assistance should be rendered in order to remove them.

† Ut enim si quis in lecythum angustæ oris olivæ nucleum immittat, hunc transversarum reducere non facile est; sic sane mulieri est gravis affectio, ubi fœtus transversarius fuerit; etenim ipsum exire per arduum: grave vero etiam est, si in pedes prodierit et plerumque aut matres aut puellæ aut ambo, pereunt. Est autem et hæc magna causa cur non facile exeat, si mortuus aut sideratus aut duplicatus fuerit. [De Mulier. Morb. lib. 1, tom. vi.]

This, I maintain, is all wrong; nature, under ordinary circumstances, being quite as adequate to accomplish the labor when the pelvic extremities present, as when the head comes first. At the same time, it must be conceded that, as a general principle, delivery in head presentations is more advantageous for both mother and child. What I wish to impress upon you is this—do not, simply because the breech, knees, or feet are found at the upper strait, therefore conclude that interference is called for.

Besides the conditions for natural labor already mentioned, it is essential that there be no disproportion between the dimensions of the fœtus and the pelvis through which it has to pass. Again: the adhesions of the placenta to the uterus should not be such as to resist the efforts of the latter to detach it; nor should the umbilical cord be relatively or positively too short.

Presentations of Fœtus in Natural Labor.—So far as regards the presentations of the fœtus in natural labor, they may be enumerated as follows: 1. The vertex; 2. The face; 3. The breech; 4. The feet; 5. The knees. In either of these presentations, therefore, I wish you to recollect, if there arise nothing to complicate the delivery, nature can, by her own resources, accomplish the expulsion of the child; and it must be borne in mind that any other region of the head, except the vertex and face, is preternatural; to this fact, however, your attention will be more particularly drawn when treating of preternatural labor. We have already described the mechanism by which the head is made to pass through the pelvic canal in a vertex presentation,* and shall now speak of the interesting subject of face presentations.

Statistics of Face Presentations.—Instances in which the face is found at the superior strait are comparatively rare; occurring, according to statistics derived by Dr. Churchill, from British, French, and German sources, 1167 times in 260,817 cases, or about one in 223½.† The majority of writers class this presentation among preternatural labors; but I cannot understand why—for it is a matter of clear observation that nature is perfectly competent to effect the delivery if left alone. Indeed, it is a very significant fact, well worthy of reflection, and amply proved by statistics, that, in face presentations, death, among both mothers and children, is most frequent when science attempts to interpose. This is an important circumstance, and should inspire you with renewed confidence in the ability of nature in this species of labor. In the Dublin Lying-in Hospital, under the mastership of Dr. Collins, in 16,654 births, there were thirty-three presentations of the face; these cases were all submitted to the natural process, and all the children born alive, except four, one of which was acephalous.‡ In

* See Lecture IV.

† Churchill, fourth London edition, p. 410.

‡ A Practical Treatise on Midwifery, by Robert Collins, M.D., p. 32.

the same well-conducted charity, under the mastership of Dr. Shekleton, as reported by Drs. Johnston and Sinclair, in 13,748 deliveries, the face presented thirty-one times, all the children born alive, except six, and recovery of all the mothers but one, she having died of peritonitis. Of the six children born dead, one was an acephalous monster, one sunk from pressure of a loop of the cord, and the death of another was ascribed to a beating to which its mother had been subjected.*

These statistics I regard most interesting in their practical bearings, and, to my mind, are irresistibly conclusive—if proof be needed—as to the propriety of classing face presentations among those of natural labor.† And again, they demonstrate how well nature is prepared to discharge her duty when not encroached upon by unwarrantable officiousness. It is the opinion of some writers that, in all cases in which the face presents, an attempt should be made to bring down the vertex; others recommend in these instances version, while some are more wedded to the forceps as the only means of terminating the delivery. These various directions, gentlemen, do well enough, perhaps, in the books, but they are utterly out of place at the bedside of the parturient woman.

Diagnosis.—It will be difficult, under ordinary circumstances, positively to decide that the face presents, previously to the rupture of the membranous sac; but after this has taken place, an attentive examination per vaginam will soon disclose the true nature of the presentation. The first circumstance which will become obvious, is the marked irregularity of the surface of the part with which the finger comes in contact; then the different features will be felt and recognised, such as the eyes, nose, and mouth. Occasionally, however, when severe pressure has been exerted by the uterus, the general character of the face will be so altered by the tumefaction it has undergone, as to render it difficult to decide at once the question of presentation. It is in these cases of compression of the parts, that the eye may be mistaken for the external organs of generation in the female fœtus, or the nose for the penis in the male.

The face is more likely to be confounded with the breech than with any other portion of the fœtus; when, for example, the finger reaches the malar bone, this latter may, without due caution, be mistaken for one or other of the tuberosities of the ischium; all doubt, however, will be at an end if the finger should distinctly feel the mouth and gums of the child. Let me here advise you of the importance, as far as may be, of the early recognition of a face

* Practical Midwifery. By Drs. Johnson and Sinclair, p. 75.

† In the deliveries under my direction in the Royal Maternity and other charities, the face presentations alone have been 110; of these, 102 were born living, under the natural efforts. Of the eight still-born children, in the above number of face presentations, one was in a putrid state, and had been dead long before labor set in. [Illustrations of Difficult Parturition. By John Hall Davis, M.D. London, 1858. Page 7.]

presentation; repeated vaginal examinations in these cases will necessarily expose the child to more or less danger. For instance: the eye would incur the risk of injury, if indeed it were not destroyed, by the too frequent introduction of the finger.

You might, perhaps, suppose that a positive evidence of a breech presentation would be the discharge of meconium; this, however, is not so. I have met with instances in which the meconium has passed into the vagina in head presentations, and this may occur in cases in which any extraordinary pressure is exercised on the body of the child by the contracting uterus.

Prognosis.—It is, I think, quite consistent with the results of practice to say, that the child is ordinarily born alive in presentations of the face; and the convalescence of the mother as favorable as in an ordinary vertex delivery. It is not unusual, however, for the child to come into the world with its features extremely distorted, owing to the general swelling of the face; but this in a few days will disappear, and in no way compromises the life or health of the infant.

Looking at the facts as they exhibit themselves in the lying-in chamber, the face will be found, as a general rule, to present at the superior strait in one of two positions, although, occasionally, there will be variations. The mechanism, however, by which the head makes its transit through the pelvic canal is essentially the same.

Presentation of the Face in the First Position.—In

this position, the finger being introduced into the vagina, and carried up to the mouth of the uterus, will feel the nose; in passing the finger from the right to the left side of the pelvis, along the dorsum or back of the nose, the coro-



FIG. 48.

nal suture will be recognised; this proves evidently that the forehead of the fœtus is toward the left iliac bone; and, consequently, the chin will regard the right ilium (Fig. 48); so that the fronto-mental diameter of the face is in apposition or correspondence with the transverse or bis-iliac diameter of the superior strait; while, on the contrary, the transverse diameter of the face is parallel to the sacro-pubic diameter of the pelvis, in the first position; and hence

it is called the *right mento-iliac*. According to Naëgelè, in this position the right side of the face is slightly lower than the left.

In response to the contractile efforts of the womb, the head is made to descend into the pelvic cavity; it there undergoes a rotary movement, which so changes its relation that the fronto-mental diameter of the face accords with the right oblique diameter of the pelvis, and the chin is opposite to the right foramen ovale; the chin



FIG. 49.

is next brought behind the symphysis pubis, and the forehead turned into the cavity of the sacrum (Fig. 49). From what has just been said, it is obvious that the forehead is obliged to traverse the anterior surface of the sacrum, while the chin descends only the length of the symphysis pubis, in order to reach the inferior strait. The progress of the face having been thus far accomplished, the chin, under the expulsive influence of the uterus, is made to pass under the symphysis pubis, while the occiput is pushed downward, and the flexion or

disengagement of the head is completed.

Here let me caution you to guard with great care the perinæum during the progress of the delivery, for the distension which it is called upon to undergo in the descent of the face is much greater



FIG. 50.

than in a vertex presentation; and, without a due degree of vigilance, rupture may take place, always an unpleasant complication of childbirth, and sometimes resulting seriously to the mother. When the head has passed the vulva, the face is turned upward. As the delivery proceeds, the head undergoes the movement of external rotation in the same way that this movement occurs in the presentation of the vertex, and which has been described in a previous lecture.

Presentation of the Face in the Second Position.—In

this position, which is precisely the reverse of the first, the fore-

head is towards the right iliac bone, while the chin regards the opposite point of the pelvis (Fig. 50). On a vaginal examination, the finger, if directed along the dorsal surface of the nose to the left, will distinctly feel the nostrils, while the coronal suture will be found to the right; thus showing a reverse position, and constituting the *left mento-iliac position of the face*. The mechanism of passage in the second position of the face is, in all respects, the same as in the first, excepting that, in consequence of the change in the direction of the face at the superior strait, the movement of rotation is from left to right, instead of from right to left.

It is well to remember that, in face presentations, the duration of labor will usually be more or less protracted, for the reason that the bones of the face not undergoing compression, as is the case with those of the cranium, do not mould themselves to the form of the pelvis, and consequently a more lengthened duration and greater effort are necessary for the transmission of the parts through the pelvic canal. It is an error, however, to suppose that the safety of the child is necessarily dependent upon the shortness of the labor. You will sometimes have occasion to note the falsity of such an opinion. The error frequently leads to officiousness on the part of the accoucheur, and consequent injury to mother and child. Indeed, I am disposed to say that, all things being equal, *slow births are generally safe births*. Permit me to enforce this upon you as a maxim in the lying-in chamber; it is, as you must perceive, strictly conservative, and at the same time strictly true.

Presentation of the Pelvic Extremities.—I have told you that, when either of the pelvic extremities is found to present at the superior strait, nature will be competent to achieve the delivery, unless something, other than the mere presentation, should interfere, calling for the assistance of the accoucheur. You will read in the books some very contradictory opinions upon the subject of these presentations; and you will be not a little surprised at the conflicting rules inculcated for their management. For example, as has already been stated, Hippocrates regarded this character of presentation as contrary to nature; his direction was, whenever the breech, feet, or knees were discovered at the upper strait, to introduce the hand, and, through the operation of version, to bring down the head! Again: the doctrine has prevailed, and been sustained by Antoine Petit, Boucher, and others, that the most natural presentation is when the feet come first; and, in keeping with this opinion, it was suggested that, in cases of head presentation, the accoucheur should turn and bring down the feet. But, gentlemen, it is not necessary to refer more at length to the various opinions of authors on this question. The substantial point for you to remember, and which will serve you when at the bedside of your patient is, that the presentation of the pelvic extremities is

undoubtedly entitled, for the reasons already mentioned, to be classified as perfectly consistent with natural labor.

I. Presentation of the Breech.—The nates or breech present much more frequently at the superior strait than either the feet or knees. Dr. Churchill, with his usual industry, has furnished some interesting statistics, touching the frequency of breech presentations, taken from the records of British, French, and German practice. In an aggregate of 197,318 cases, the breech presented 3325 times, or about 1 in $59\frac{1}{2}$; and in 1148 cases, all he has been able to collect, 337 children were lost, or about 1 in $3\frac{1}{2}$. At first sight, this would appear to be a great mortality; but it must be recollected that these tables are derived from very mixed sources—that is, in many instances, no doubt, the presentation of the breech being regarded as preternatural, artificial aid was had recourse to, and in this way, it is not at all improbable that the safety of the child was compromised. In order to show the actual as well as the relative fatality to the child, in this form of presentation, it does seem to me that an essential prerequisite for such data would be, to derive our facts from those cases which had been entirely confided to nature, and where, consequently, there had been no interruption to the natural process by premature or unjustifiable interference. We should then be better able to approximate a just comparison, all things being equal, between the proportion of children lost in breech and vertex presentations.*

The presentation of the breech was formerly regarded as one of great danger, because it was supposed that the child thus, as it were, doubled on itself, could not have sufficient space to enable it to be transmitted through the pelvis. This opinion, however, is without foundation, for the parts composing the breech are quite compressible, and will yield to the forces of the uterus. Based upon the apprehension that the breech could not pass, it was a favorite practice among some of the English accoucheurs always to interpose, endeavor to push it upward, and then search for the feet,

* Dr. Collins, who recommends that, in the absence of any complication, there should be no interference in breech presentations, reports this presentation to have occurred 242 times in 16,654 deliveries. Of these 242 children, 73 were still-born, of which 42 were putrid. Forty of the 242 were premature births, 28 of which were still-born. Fourteen of the 28 were born at the eighth month; twelve at the seventh; one at the sixth; and one at the fifth. Twenty-six of the 28 were putrid. Twelve of the 40 premature children were born alive, viz., two at the sixth month; seven at the seventh; and three at the eighth month. These statistics are extremely interesting and, as far as they go, are decidedly in favor of the position I have assumed. It is but fair, I think, to deduct from the 73 still-born cases, the 28 premature births, which were also still-born, for as 26 of the 28 were putrid, it is strong proof that their death was altogether unconnected with the particular form of presentation. Therefore, Dr. Collins' statistics will give us 45 still-born children in 242 breech presentations, or about 1 in 5 1-2, which it will be perceived differ widely from the results furnished by Dr. Churchill.

and deliver the child in this manner. Such practice was not only bad practice, for it had no justification whatever, but it was most destructive to the child, and, at the same time, full of peril to the mother.

I can afford you no better admonition upon this subject, than by recording the experience of Dr. Hunter, who, in the commencement of his professional career, became so imbued with the prevailing opinion at that time, that he adopted it, but soon found cause for its repudiation. "When," says he, "I first began practice, I followed the old doctrines in breech presentation, although I did not like them; but yet dared not broach new ones, till I got myself a little on in life; *at this time I lost the chill in almost all the breech cases*; but since I have left these cases to nature *I always succeed.*"* There is much good sense in this observation of Hunter, and it demonstrates the folly of blind obedience to mere opinion.

Diagnosis.—It will, in general, be extremely difficult to recognise a breech presentation before the rupture of the "bag of waters;" but after the escape of the amniotic liquor, a careful examination will enable you to detect the nates at the upper strait; the finger will feel a rounded tumor, softer than the head, and imparting somewhat of an elastic sensation; the cleft between the nates and the organs of generation will also be important guides; there is usually, likewise, in this presentation, a discharge of meconium. In consequence of the great tumefaction of the face, and the necessary alteration of its features, errors have sometimes been committed by confounding it with the breech of the infant. Indeed, under certain circumstances, it will need more than ordinary circumspection to avoid the blunder. However, as has already been remarked, the recognition of the mouth and gums, together with the nose, will readily dissipate all embarrassment.

In women, whose abdominal walls are not loaded with adipose or fatty matter, and which, in consequence of previous births, are in a state of more or less relaxation, it will sometimes be possible to feel quite distinctly, through these walls, the head of the fœtus turned upward. This is a very positive indication, in case of a single pregnancy, that one of the pelvic extremities presents, and which it is, must be determined by a vaginal examination. Again: a strong evidence of this kind of presentation is disclosed by the fact of your being able to detect the pulsations of the fœtal heart on a level with, or above the umbilicus.

It is an interesting circumstance that, when the fœtus is dead, the anus is open, so that the apex of the finger may be introduced; but when alive, it is closed. As the nose is an important guide in face presentations, so the coccyx is when the nates present, not only indicating the character of the presentation, but also the true position of the part. It is possible to confound the breech with

* Hunter's Lectures, MS., 1768.

the shoulder, and it is essential that the distinction should be made early, for, as we shall tell you, when speaking of the management of a shoulder presentation, it is very important that a correct diagnosis be arrived at before the labor is far advanced. The acromion process, without a due degree of care, may be mistaken for the tuberosity of the ischium; but the absence of the ribs, which can be easily felt in a shoulder presentation, will remove all doubt upon the subject.

Prognosis.—Although it is unquestionably true that, when the pelvic extremities present, nature is competent to accomplish the delivery, yet it must not be forgotten that the mortality to the children is much greater than in vertex presentations; and, I am inclined to refer, with most authors, this increased mortality to the undue pressure exerted on the umbilical cord, thus interrupting the circulation between the fœtus and placenta. The death of the child may also be the result of delay in the delivery of the head, after the other portions have passed into the world. Notwithstanding this comparative mortality of the child in pelvic presentations, yet it cannot be denied that the danger is much enhanced, and the fatality, therefore, augmented by the officiousness of the accoucheur, in not submitting these cases to nature.

As regards the mother, there is no more danger in a pelvic than in a vertex presentation; and, contrary to the generally received opinion, when the breech presents, the labor is usually more favorable and shorter than when the feet are found at the superior strait. It is not difficult to explain this circumstance. As soon as the nates begin to descend into the pelvic excavation, they produce upon the surrounding parts a pressure, which immediately calls into action the tributary influence of the spinal cord, thus adding vigor

and efficiency to the contractions of the uterus. This, as is evident, is not the case when the feet present first, for the reason that the diminished volume of the presenting parts is incapable of making the degree of pressure necessary to evoke the reflex action of the cord.

The breech, feet, and knees may assume four different positions at the superior strait, and we shall now proceed briefly to describe the mechanism of transmission in each of these positions.

First Position of the Breech.

—The sacrum of the fœtus regards the left acetabulum (Fig. 51), constituting the *left anterior sacral position*. Here, the nates,



Fig. 51.

back, and occiput, correspond to the left anterior portion of the uterus and pelvis, while the abdomen, chest, and face regard the right posterior portion. It will thus be seen that the nates present at first diagonally at the superior strait; but as, in response to the contractile efforts of the uterus, they are made to descend, the right is turned toward the sacrum, the concavity of which it pursues (Fig. 52), while the left is placed under the pubes, forming, as it were, for the other a point of



Fig. 52.



Fig. 53.

support. During the progress of the delivery, the right hip appears first at the vulva (Fig. 53), and then the trunk is expelled, being slightly curved in the direction of the pubes. As soon as the breech makes pressure on the perineum, great care should be exercised in giving proper support to the latter, in order to prevent rupture; and, as the hips pass out of the vulva, a loop should be made of the cord, by drawing down a small portion of it. If the pulsations be found to grow weak, the delivery should be hastened by tractions on the body of the child, as will be described when speaking of preternatural labor.

The arms, because of the resistance offered them by the brim of the pelvis, will occasionally ascend toward the face so as to become extended on the lateral portions of the head; the shoulders descend diagonally at the superior strait, the right, which is posterior, appearing before the left, which is in front; in the pelvic cavity they undergo the movement of rotation, which, of course, places them in the direct position at the inferior strait, whence their expulsion is soon followed by that of the arms. The head passes from the superior strait into the pelvic excavation in a flexed condition, the chin being approximated to the sternum, the occiput turned toward the pubes, and the face toward the sacrum; thus, with the neck under the arcade of the pubes, and the face resting against the coccyx and perineum, the chin escapes from the vulva, and the delivery is completed.

Second Position of the Breech.—The sacrum regards the right acetabulum—the *right anterior sacral position*. Here, the nates, back, and occiput, are in front, and to the right; the abdomen,

chest, and face behind, and to the left. The mechanism in this position, is fundamentally the same as in the first.

Third Position of the Breech.—The sacrum corresponds with the right sacro-iliac symphysis—the *right posterior sacral position*—the breech, back, and occiput being behind, and to the right, while the abdomen, chest, and face are in front, and to the left. This position is the reverse of the first, and the same mechanism causes the delivery of the child. The head, however, will experience somewhat more difficulty in its egress, from the fact that the face is obliged to glide along the symphysis pubis, while the occiput is passing the hollow of the sacrum, the coccyx, and perineum.* The head, in its exit from the vulva, becomes extended, so that the chin first,† and successively the mouth, nose, and forehead emerge from under the pubes.‡

Fourth Position of the Breech.—The sacrum corresponds with the left sacro-iliac symphysis, and is the reverse of the second—the *left posterior sacral position*—the breech, back, and occiput are behind, and to the left; the abdomen, chest, and visage in front, and to the right. Here again, the mechanism is precisely the same as in the preceding position. It is worthy of remark that, in the various breech presentations, the inferior extremities almost always remain flexed lengthwise upon the trunk, and usually pass out of the vulva simultaneously with the head.

Presentation of the Feet.§—When the feet present, it is possible

* In addition, in these posterior sacral positions, the head of the child will be very apt to be obstructed by the chin catching, as it were, upon the ramus of the pubes, giving rise necessarily to a protracted delay, and involving, in more or less peril, the safety of the infant. In order to prevent this difficulty, as soon as the hips are being delivered—if nature have not spontaneously changed the position, which she sometimes, though rarely, does—the hips should be gently grasped by the two hands, and the body of the child rotated upon its long axis, for the purpose of converting the posterior sacral into one or other of the anterior sacral positions; the third being changed into the second, and the fourth into the first.

† Dr. Ramsbotham says, "I believe that in no instance, if the case were left entirely to nature, provided the child and pelvis were of common size and form, would the face be expelled under the arch of the pubes." This is adverse to my observation on the subject, and is certainly not consistent with the evidence furnished by the lying-in room. [Ramsbotham's System of Obstetrics. Kenting's edition, p. 327.]

‡ It will sometimes happen, as an exceptional circumstance, that the face, under the influence of a strong contraction of the uterus, will be turned from the symphysis pubis into the hollow of the sacrum, and the body of the child will also participate in this semicircular movement. It was Naëgelè who first directed attention to this fact, and observed it to occur only when the fetus was small, and not at full time. Scanzoni, however, records two instances of this conversion, in which it took place when the fetuses were large, and had completed their intra-uterine life.

§ In 192,174 cases, there were observed 1831 foot or knee presentations, or about 1 in 105. The mortality to the children 1 in 24.—[Churchill's Midwifery, 4th London Edition, p. 427.]

to confound them with the hand of the fœtus; and this, you may readily imagine, would result in a serious complication of the labor. For example, suppose the accoucheur, always in the habit of interfering in these cases, because he believes them preternatural, should seize the hand at the superior strait, and, mistaking it for the foot, make traction, and bring it down into the vagina. It would then be too late to repair his error, for he would find it not so easy a thing to replace the hand.

Diagnosis.—The diagnosis of a foot presentation is not difficult; it only needs thought and judgment to make the proper distinction. In the first place, the foot is thicker and larger than the hand; the toes are shorter than the fingers, the great toe being near its fellows, while the thumb is separated from the fingers; the foot is narrow, the hand is broad and flat; the foot is at a right angle with the leg; the hand, on the contrary, is, as it were, but an extension of the forearm.

First Position of the Feet.—The heels regard the left acetabulum, and the toes the right sacro-iliac symphysis—the *left anterior-calcarneo position*. The breech, back, and occiput are toward the left anterior portion of the uterus and pelvis; the abdomen, chest, and face toward the right posterior portion. As in the case of breech presentation, the feet cannot be readily recognised until after the rupture of the membranous sac.

Second Position of the Feet.—The heels regard the right acetabulum, the toes the left sacro-iliac symphysis—the *right anterior-calcarneo position*. The breech, back, and occiput in front, and to the right; the abdomen, chest, and face behind, and to the left.

Third Position of the Feet.—The heels regard the right sacro-iliac symphysis; and the toes the left acetabulum, being the reverse of the first position—the *right posterior-calcarneo position*. The breech, back, and occiput behind, and to the right; the abdomen, chest, and face, in front, and to the left.

Fourth Position of the Feet.—In this position, the reverse of the second, the heels are turned toward the left sacro-iliac symphysis, and the toes toward the right acetabulum; the *left posterior-calcarneo position*. The breech, back, and occiput, behind, and to the left; the abdomen, chest, and face in front, and to the right.

In the various positions of the feet, the mechanism, after the escape of these latter, is precisely the same as in the breech presentations; and, therefore, it is unnecessary to repeat what we have said on the subject.

First Position of the Knees.—The tibiæ correspond with the left acetabulum, and the thighs with the right sacro-iliac symphysis—the *left anterior-tibial position*.

Second Position of the Knees.—The tibiæ at the right acetabu-

lum, the thighs at the left sacro-iliac symphysis—*right anterior-tibial position*.

Third Position of the Knees.—The tibiae to the right sacro-iliac symphysis; the thighs to the left acetabulum; this is the reverse of the first position—the *right posterior-tibial*.

Fourth Position of the Knees.—The tibiae to the left sacro-iliac symphysis; the thighs to the right acetabulum, the reverse of the second position—the *left posterior-tibial*.

As soon as the knees are expelled, the various positions are reduced to the corresponding positions of the feet. Without care, it may be possible to confound the knee, especially when only one can be felt at the superior strait, with the elbow or shoulder. In the case of the elbow, the olecranon process and condyles will serve as guides, while the ribs and axilla will determine the fact of a shoulder presentation.

It will be seen that I have not spoken of the management of pelvic presentations in cases in which the labor becomes complicated, and in which consequently it will be necessary for the accoucheur to interpose. This subject will be discussed in a future lecture, when treating of preternatural labor.

LECTURE XXV.

The young Accoucheur's Debut in the Lying-in Chamber—What he is to do, and what he is not to do; his Chat with the Nurse—The Examination per Vaginem; how it is conducted, and what it should reveal—Is the Patient Pregnant?—Is she actually in Labor?—Are the Pelvis and Soft Parts Normal or otherwise? A Woman may imagine herself in Labor, and yet not be Pregnant; Illustration—What is the Presentation of the Fœtus?—Is it Natural or Preternatural?—What will be the Duration of the Labor?—How this question is to be answered—When Labor has commenced, the Bowels and Bladder to be attended to—Quietude of the Lying-in Woman important; Loquacity of the Nurse—The Stages of Labor; what are they!—Conduct of the Accoucheur during each of these Stages—After the Escape of the Head, Rule to be followed—When the entire Expulsion of the Fœtus is completed, important rule to be observed—How many Ligatures are to be applied to the Cord!—The Author recommends but one—Reasons for—Trismus Nascentium, and Inflammation of the Umbilical Vessels; Scholer's Opinion—When the Child is separated from the Mother, what is to be done!—Respiration of the Infant; Causes which Impede it—Asphyxia; Causes of—Treatment of Asphyxia—Marshall Hall's Method—Ability to resist Asphyxia greater in the New-Born Infant than in the Adult—The Opinion of Brachet, of Lyons, Josat, and others, as to the Restoration of Life some time after the Pulsations of the Heart have ceased—Death of the Mother not necessarily Fatal to Fœtus in Utero; Why!—Brown-Séquard's Experiments.

GENTLEMEN—We will now suppose that your services are demanded in a case of labor; and shall, therefore, proceed to speak of the duties devolving upon you at the bedside of your patient. The first entrance of the young accoucheur into the lying-in chamber is a matter of no little importance. In the first place, he has popular prejudice to contend with; he is not “an old gentleman, and consequently knows nothing of his business.” The only means of putting an end to this prejudice, and of demonstrating that, although not a patriarch in years, yet he is nevertheless fully competent to the discharge of his duties, is his conduct after he crosses the threshold of the parturient room. One mistake in his debut in obstetric practice may exert a singularly unhappy influence over his future prospects; should he, on the contrary, make a favorable impression in his first case, the best consequences may ensue to him. Something more is required of the accoucheur, if he wish to succeed, than a profound knowledge of his subject: conjoined to an intimate acquaintance with the varied details of the sick-room, he must understand human nature; he must discriminate between a harmless concession to popular whim or caprice, and a concession

which may compromise his own character and the dignity of his art. In a word, he is constantly to bear in mind the full measure of his responsibility.

Punctuality and promptness, in responding to professional calls, are especially important in the practice of obstetric medicine. A messenger has arrived, requesting the immediate attendance of the accoucheur. The latter proceeds without delay to the residence of the patient; he rings the bell; he is admitted; and if this should be his first professional visit to the family, all eyes will naturally be turned toward him, surveying him with marked care; if he falter under the scrutinizing gaze, it will very likely be attributed to want of professional skill! His general bearing, as soon as he enters the house of his patient, should be that of a well-bred gentleman; he should manifest no excitement, but his conduct be such as to impress the conviction that he is accustomed to these calls, and understands how to comport himself. Soon after being introduced into the parlor, the nurse will probably leave the patient for the purpose of having a little preliminary chat with the doctor. In this interview with the nurse, if adroitly conducted, much can be learned as to the general condition of the patient—whether it is her first child—whether the labor has regularly commenced, whether she has suffered unusually from her pains, whether she is nervous and irritable, whether she is agitated at the doctor's arrival.

These preliminaries over, the nurse then leaves with the promise that, in a few minutes she will return, and conduct you to the sick room. When you enter the room, your patient will be reclining on the bed or sofa, or sitting in a chair. In either case, you approach her gently and courteously, and, instead of saying, "Well, madam, you are about to have a baby—does it hurt much?" or some such kindred expression, bearing the impress of a vulgar mind—I say, in lieu of such rudeness, you enter into conversation with her, talking of any and everything except of the subject directly connected with the object of your visit. Talk of France, or Egypt, or Kamschatka, or the marine telegraph; in this way, a little professional diplomacy will enable you very successfully to accustom your patient to your presence. The first interview has passed; she finds that, after all, it is not such an embarrassing thing to hold converse with a doctor, and you will have impressed her quite favorably merely by your manner. She will rather like you, and will be apt, as soon as occasion presents itself, to say to the nurse—"What a clever man that is; he is so very agreeable." "Yes, madam," replies the nurse, "he knows what he is about." These mutual compliments between patient and nurse give you a substratum in that family; your authority will be hearkened to, and you will have achieved an early and important victory. Well, thus much for the first scene—what next?

The object in sending for you was of course to have the benefit of your counsel and skill; as soon, therefore, as you have fairly introduced yourself to your patient, it will then be essential to become satisfied as to her true condition; to do this it will be necessary to institute a vaginal examination. For this purpose, you speak to the nurse, and tell her that you are anxious to ascertain how things are progressing. This is communicated by the nurse to the patient, and her assent is readily obtained; for, as a general rule, she will be found most solicitous to know if "all is right."

Allow me here to call attention to some few details in reference to this first examination. The patient should be in the recumbent position, either on her side or back; and whichever position may be assumed, it is important that she be near the edge of the bed, so that you may have every facility for conducting the examination. While the nurse is arranging the patient, you will generally be requested for the time being, to walk into an adjoining room; but if not, be careful that you occupy yourself with something else than gazing at the movements of the parties; take a seat, and turn your back; become thoughtful, as if lost in the solution of some great professional problem; or, if a book be at hand, open it, and improve your mind. When everything has been arranged, you then proceed to make the examination, the mode of doing which has already been pointed out in Lecture XIII., to which I refer you. When you are summoned to attend a lady who supposes herself to be in labor, the examination which you institute will have the following objects: 1. Is she pregnant? 2. Is she actually in labor, and has the os uteri begun to dilate? (Fig. 54.) 3. Are the pelvis and soft parts in a normal condition, or are they deformed? 4. Is the presentation of the fœtus in accordance with



FIG. 54.

the requirements of natural labor, or is it otherwise? These are the points to be ascertained in this exploration.

I. *Does Pregnancy Exist?*—You may think it strange, almost bordering on the ridiculous, that your services should be required by a lady who imagines her labor at hand, when in fact she is not

in gestation. But, allow me to tell you that such occurrences are now a part of history; and it would be a severe blow to your virgin aspirations to be found ministering, for several days, to the wants of a patient supposed to be in parturition, who in truth was not even pregnant. Women who have never borne children, and whose desire it has been to have offspring, are sometimes quite apt to imagine themselves in a state of gestation; as I have remarked in a preceding lecture, the accoucheur should never rely upon any statements made by his patient in cases of this kind. It is his duty to judge for himself, irrespective of all adventitious or other influences. His mind must be free from bias, and his decision of the case based upon the evidence which may be presented to his senses. Such is the rule of conduct I would most earnestly enjoin on all, who may wish to discharge their trust fearlessly, and at the same time justly.

A most amusing case occurred in this city some years since, and will, perhaps, serve more effectually to illustrate an important truth in midwifery than any argument I can advance. It is what may be denominated a tangible fact, and is entitled to full appreciation:

A lady, aged 47, married since her thirtieth year, had cherished an ardent desire to become a mother, but had not succeeded in her wishes. She was about abandoning all hope, when, of a sudden, she noticed that her abdomen began to enlarge, and really imagined herself pregnant. In addition to other symptoms, she thought she distinctly felt the movements of the child. Her heart was full of joy; she received the congratulations of her numerous female friends, who complimented her on her prowess, and the final accomplishment of her hopes after years of fruitless effort; she commenced making the necessary preparations for her approaching accouchement. Her physician was advised of the happy circumstance, and informed that his services in due time would be needed. In the course of a few months the labor commenced; a messenger hastened to apprise the doctor that the lady's time had come, with an urgent request that he would be prompt in reaching the bedside of his delighted but suffering patient. The doctor arrived—all in the house was confusion, and in high expectation; the nurse was enchanted; the husband, in a spirit of humility, could scarcely realize the advent of this long expected era in his life; the patient was in actual labor; the pains frequent and distressing. The physician was entreated by the good nurse to lose no time in assisting madam; he made an examination; the silence of death now pervaded the lying-in chamber to receive from the lips of the oracle the exact facts of the case; the friends were soon made joyful, by hearing from the doctor that all was right—that the labor was quite advanced, and in a very short time would be completed. The sufferings of the patient increased; she was urged to make the most of her pains: "To bear

down and assist nature"—when lo! in the midst of one of those powerful efforts to "assist nature," there was heard an explosion, which struck terror into all present, the doctor included. The patient, as soon as she recovered from the prodigious effort which had occasioned the explosion, exclaimed: "Oh! dear Doctor, it's all over; do tell me if it's a boy!" The explosion was nothing more than an escape of air from the bowels; the patient having mistaken flatulence for pregnancy, and the rumbling of the gas in the intestines for the motions of the fœtus! Let this case, therefore, keep before you the recollection of the fact, that one of the first duties devolving on you in the examination is to be certain that your patient is pregnant.

II. *Has Labor Actually Commenced?*—You have only to refer to what we have said in Lecture XXIII., regarding the signs of labor, and the mode of distinguishing between true and spurious pains, to be enabled at once to determine whether the parturient effort has really begun. If you find labor is in progress, your next care will be to acquaint yourselves with the character of the pains; are they merely commencing, and, therefore, slight, or have they already assumed a degree of intensity? What is the condition of the os uteri? Has it begun to dilate, and to what extent? Does the membranous sac protrude, and what is its volume? These are important questions, for they will aid you in the prognosis as to the probable duration of the labor. Has your patient already borne a child, or is she a primipara? In the latter, the labor is usually more protracted.

III. *Are the Pelvis and Soft Parts in a Normal Condition?*—While conducting the vaginal examination, you should not fail to assure yourselves of the state of the pelvis and soft parts. Is the former natural in its dimensions? Is it deformed? If so, whether by an increased or diminished capacity? Is its diminished capacity such as to involve the safety of the mother or child, or will it only tend to make the labor tedious and more lengthened? How is the uterus—does it preserve its parallelism with the axis of the superior strait—or is it malposed, so as to exhibit either of the obliquities to which we alluded in the previous lecture? How are the vagina and vulva? Are they contracted and rigid, or relaxed and dilatable? Is the bladder distended, or the rectum more or less filled with fecal matter? These are so many points to be ascertained by the accoucheur in his first exploration; they will involve no difficulty on his part, if he understand himself—nor will they, in any way, expose the patient to annoyance or suffering; the index finger carefully introduced will be all that is necessary to arrive at just conclusions upon these various heads.

IV. *Is the Presentation of the Fœtus in Accordance with the Requirements of Nature?*—Does one of the extremities of the

ovoid present at the superior strait? If so, which is it? Is it the head, breech, feet, or knees? If the head, is it the vertex, or face, and what position does it assume? If the presenting part have begun to descend into the pelvic cavity, is its descent consistent with the mechanism of labor, or otherwise? Instead of one of the extremities, is some portion of the trunk of the fœtus at the upper strait, constituting a cross birth? In addition, the careful accoucheur will inform himself as to other points; such as the temperament, disposition, age, moral and physical condition, etc., of his patient. Is she plethoric, or feeble, and nervous? Is she in good health, or is her labor complicated with some serious disease, either of an acute or chronic form? Is she young, or has she already approached the meridian of life, and yet a primipara?

It can scarcely be necessary to impress upon you the importance of becoming thoroughly and promptly cognizant of these various conditions; in doing so, you place yourselves in a strong and safe position; you know, at once, whether the labor is natural, or whether the interposition of science will be called for. In truth, with this knowledge, you will be not unlike the skilled general on the battle field, who, having fully informed himself of the various points of the field itself, and of the strength and arrangement of the adverse forces, knows, not only how, but when to make his attack. Under these circumstances, his charge upon the enemy will usually be one of victory, for the reason that it has been well considered, and based upon a knowledge of circumstances more or less essential to success. So, gentlemen, will it be in the lying-in chamber in cases of trouble, if you will early inform yourselves of the true nature and extent of the difficulty to be overcome.

Duration of the Labor.—Well, the examination has been made, and you are in possession of all the circumstances of the case, having ascertained that everything is auspicious to a natural delivery. A pressing question, which will be urged not unfrequently by the patient and friends, as soon as you have completed the examination, will be as to the probable duration of the labor. Much anxiety will be evinced for a prompt reply to this interrogatory, and the friends will be more or less importunate for your opinion. No measure of experience will enable you to give an unqualified answer to this inquiry, for there is a vast deal of caprice about nature, and although we may approximate, yet we cannot definitely fix the period which she will require for the completion of her work. In order, therefore, to relieve the very natural anxiety on this point, and, at the same time, avoid a positive committal, you should say—*all is right, and everything will depend upon the character and efficiency of the pains.* This is certainly an equivocal answer, but it will be accepted as quite satisfactory, and will serve to liberate

you from the consequences of naming any particular time in which the delivery may be accomplished.

Duties of the Accoucheur after Labor has Commenced.—As soon as you have ascertained that your patient is in labor, your next care should be to conduct her safely through it, and with this view, we shall now speak of certain duties, which will necessarily devolve upon you. In the first place, if the bowels have not been evacuated for one or two days, and more especially if the rectum be distended with fecal matter, it is quite essential that an enema should be administered, or, if preferred, some castor oil; and also if there be an accumulation of urine in the bladder, the patient should be directed to attempt to relieve herself; if, however, she should be unable to do so, the catheter must be employed. You will not have forgotten what we said regarding the introduction of this instrument in the latter stages of pregnancy, or during labor; the position of the urethra at this time is nearly vertical, being more or less parallel to the internal surface of the symphysis pubis; therefore, the direction of the catheter, in order to reach the bladder, must be *from below upward*, describing nearly a perpendicular line.

Quietude in the Chamber.—I would earnestly suggest that the room of the parturient woman be kept quiet, and that she be saved the perils of excitement from the presence of persons, who can render no assistance, but who tend to contaminate the air, and oftentimes, by their frivolous conversation, disturb the patient. The nurse and one other assistant will suffice, under ordinary circumstances, for all the purposes needed. You should early study the character and disposition of your patient—if she be nervous and timid, and full of despondency, open before her vistas of hope and cheerfulness; encouragement from her physician, in the hour of tribulation, is always a grateful boon to a confiding woman, and it should not be denied her at the time at which, of all others, she most needs support and comfort. The nurse, if loquacious, and fond of recording her doleful experience of “horrible cases,” must be promptly checked. There seems to be a growing and morbid disposition on the part of certain unthinking females, to indulge in narrations of the frightful scenes they have witnessed in childbirth, and they usually avail themselves of the most inopportune occasion for their recital. Nothing of this should be allowed, for it oftentimes has a most pernicious effect.

It will be proper, as the labor is progressing, to ask the nurse if she have in readiness a piece of tape and a pair of scissors, which will be required as soon as the child is born for the purpose of tying and cutting the cord. I have known great confusion to ensue from the neglect of this apparently trivial direction.

Stages of Labor.—In order to simplify as much as possible the

question of natural labor, we shall divide it into three stages, and shall speak of what may be necessary for you to do in each one of them: First stage consists in the full dilatation of the os uteri, and rupture of the membranous sac; second stage, the descent and expulsion of the fœtus; third stage, the delivery of the placenta. Authors differ much in their division of the various stages, but the one just given you will, I think, for practical purposes, be found sufficiently comprehensive.

First Stage.—This I have just told you is occupied in the dilatation of the os uteri, and rupture of the membranous sac. During the commencement of this stage of labor, the pains are at first slight passing from the back to the thighs, and are denominated grinding; it is not until the os uteri becomes so dilated and the membranous sac and presenting portions of the fœtus begin to make a decided pressure upon it, that the pains assume a strongly marked bearing-down character. It is well to note the change in the female as soon as these latter pains are in full development; at this time, during a contraction, she grasps anything within her reach, and endeavoring to fix her feet firmly against some resisting object, she holds her breath, and concentrates all her efforts on the uterus—the diaphragm and abdominal muscles contributing their respective aid in this effort. This, I repeat, is what you will ordinarily observe as a characteristic difference in the contractions of the uterus, during the commencement and completion of the first stage. You cannot but perceive that this very difference inculcates an important practical precept, viz., not to urge your patient to make any effort, or, in the ordinary phrase, “bear down” while the pains are simply grinding; for, at this period, no effort of hers can avail; on the contrary, you should caution her to economize her strength until, when the os uteri has progressed in its dilatation, the contractions themselves become forcing, and, consequently, may be materially aided by the efforts of the female herself. The more, therefore, she endeavors to assist nature at this period, the greater, under ordinary circumstances, will be the facility of the birth.

Rupture of the Membranous Sac.—As a general principle, when the os uteri has become sufficiently dilated to enable the head of the fœtus to pass (Fig. 54), there is a spontaneous rupture of the sac, followed by the escape of more or less of the amniotic fluid. You have, in a previous lecture, been admonished not to rupture the sac prematurely; for, in doing so, you deprive nature of an important adjunct in the dilatation of the os—the uniform and steady pressure of the sac itself. When the liquor amnii escapes before the proper dilatation of the mouth of the uterus, instead of this gentle and effective pressure of the sac, there is simply the hard and unequal pressure of the head to accomplish the object, resulting ordinarily in a protracted delivery, and sometimes

in injury to both mother and child. There are, however, circumstances in which it may become essentially necessary for you to rupture the "bag of waters" early in the labor, and before the proper degree of dilatation has been accomplished. Suppose, for example, the labor from the very commencement should be extremely rapid, and that you apprehended a too sudden expulsion of the fœtus and its annexæ; in a case of this kind, it will be your duty early to afford, by rupture of the sac,

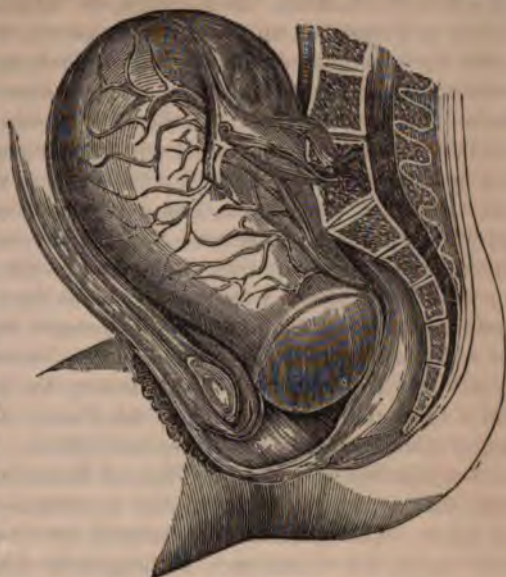


FIG. 55.
Os uteri fully dilated—membranous sac unruptured.

escape to the amniotic fluid. Should you fail to do so, the rapid and brusque evacuation of the uterine contents might endanger the life of the mother. The uterus, under these circumstances, would be apt to be thrown into a state of inertia, giving rise to hemorrhage, which, to say the least, would involve the safety of the parent in a greater or less degree of peril. If you will allow me to say so—you should, as a general rule, regard quick births as dangerous births.

Position of the Parturient Woman.—Previous to the rupture of the sac of waters, the patient may be permitted to assume whatever position may be most agreeable to her. It is a great mistake to confine her to the bed from the very commencement of her labor. In the first place, it is uncalled for; and secondly, while it enervates her strength, it is calculated also to break the wing of her spirit, and occasion more or less depression. Allow her, therefore, the largest liberty; she may sit in a chair, recline on the sofa, walk about the chamber, or get on her knees. In one word, *let her do just as she pleases*.* But after the rupture of the sac, it will be prudent for her to remain in bed.†

* If, in your examination per vaginam, you ascertain that the pelvis is unusually capacious, then it will become important to depart from this rule, and enjoin upon your patient to continue in the recumbent position during the entire progress of the labor; otherwise, from the excessive size of the pelvis, there would be danger of a sudden delivery while walking about the room. Such a contingency might result sadly.

† I am in the habit of ordering a cot to be placed by the side of the bed, for the

The position assumed by the female at the time of delivery varies in different countries. In England, the usual position is on the left side; in France, on the back—and, indeed, throughout Germany, with the exception of Vienna and Heidelberg, where the English custom seems to prevail, the woman is ordinarily delivered on her back. In some portions of Ireland, it is said, the custom obtains of having the birth completed with the woman either in the standing position or on her knees.* When there is no special objection on the part of the patient, I am in the habit of recommending the position on the back, because I think she can give herself much more efficient support than when on the side; and, in all cases of operative midwifery, whether manual or instrumental, the back is infinitely preferable. Let me here remark that, in some instances in which the contractions of the uterus become defective, I have observed great advantage from allowing the female to place herself, for a short time, on her knees; this change of position will oftentimes stimulate the organ to renewed effort.

Impropriety of Frequent Vaginal Examinations.—Let me caution you against frequent vaginal examinations during this stage of labor. The practice of constantly introducing the finger into the vagina, is a vicious one; nothing, under ordinary circumstances, can justify it; it is both annoying and injurious to the patient. After you have satisfied yourselves, as far as may be, of the true state of things in the examination you instituted at the commencement of labor, what necessity can there be for more than one or two repetitions until after the escape of the waters, when it becomes necessary again to explore, and inform yourselves as to the progress of delivery, and the precise position of the presenting part?

Diet of the Parturient Woman.—The patient should occasionally be permitted to take bland nourishment, such as tea, barley water, gruel, light broth, etc.; but do not fall into the pernicious habit of recommending wines, spirits, or other stimulants, unless specially indicated. They excite the system, and almost always do harm. Ice water will be both grateful and efficient as a drink, particularly if there be a degree of lethargy in the contractions of the uterus.

Rigidity of the Os Uteri.—In some cases, dilatation of the os uteri will be extremely slow and irksome, and this may be owing to two different conditions; 1. To extreme dryness of the parts, an absence of the mucous secretion, which we have already stated produces a lubricating influence, relaxing and preparing them for

purpose of delivering the patient; there is much advantage in this, for, after the delivery, she can be transferred to her own comfortable bed, which has been neither disturbed nor soiled by the labor.

* Dr. Rigby says, "In some remote parts of Ireland and all of Germany, the patient sits upon the knees of another person, and this office of substitute for a labor chair is usually performed by her husband."—*Rigby's System of Midwifery*, p. li.

the distension necessary for the transit of the child. In such an event, you will find much benefit in directing your patient to sit over a vase of warm water. This I have frequently resorted to, and with signal success. Advantage will also be derived from throwing into the vagina, at intervals, mucilaginous injections, or lubricating the os uteri, vagina, and vulva freely with fresh lard or butter. Here, too, the application of the Belladonna ointment will be of signal service. The abominable practice, commended by some of the older writers, of introducing the hand into the vagina for the purpose of stretching and distending it, is not for an instant to be tolerated. These rude manipulations can never receive the sanction of the scientific accoucheur. 2. The delay in the dilatation of the os uteri may be due to excessive plethora of the system, conjoined with unusual muscular rigidity. Under these circumstances, you have in the judicious employment of the lancet an efficient remedy. Abstract from the arm, early, just so much blood as your judgment tells you is indicated—six, eight, twelve ounces. The effect of general blood-letting in producing a softening of the os uteri is often marvellous. I have said resort to the lancet early, and for this reason—if the female be permitted, in this state of plethora and muscular resistance, to continue in labor for some hours without relief, she grows wearied by fruitless effort. The child incurs the hazard of undue pressure, and the mother, in this hyperæmic condition of system, is exposed to dangerous congestion of some of the more important organs.

Touching the subject of blood-letting, allow me to suggest to you an important lesson: Whenever you are summoned to attend a lady in labor, if she should be surcharged with blood, as will be indicated by her bounding pulse, flushed countenance, and general physical condition; and, *if under these circumstances she complain of more or less intense cephalalgia, with throbbing of the temporal arteries, and an approach to suffusion of the eyes*, do not hesitate to tie up the arm, and abstract blood until a decided impression has been made upon the system. A neglect of this precaution has more than once left its melancholy trace in the lying-in chamber—either in the production of puerperal convulsions, apoplexy, paralysis, or hæmoptysis. When at the bedside of his patient, the sagacious practitioner must have his eyes about him, and be prepared for whatever emergency may arise. How many noble ships have been wrecked because no precaution had been exercised until the storm had broken forth in all its resistless intensity.

While I recommend a resort to the lancet during labor, when the abstraction of blood is plainly indicated, yet I would most emphatically inculcate upon your recollection this essential obstetric truth—*women in parturition are always more or less liable to be attacked with flooding, and, therefore, great caution is to be observed*

PRINCIPLES AND PRACTICE OF OBSTETRICS.

Artificial drawing of blood. Again: excessive losses of her from flooding or the lancet, are not unfrequently serious puerperal complications. Fortunately, we have at hand several therapeutic agents, most efficient in their cases of rigid os uteri; and among them may be mentioned tartarized antimony and ipecacuanha. It is not, in my opinion, at all necessary, as some authors maintain, to insure vomiting to derive the full benefit of these remedies; I much prefer their exhibition in tolerant doses—the nausea thus occasioned and directly to relaxation of the general muscular system, which the mouth of the womb will speedily sympathize. For purpose dissolve i gr. of tartarized antimony in $\frac{3}{4}$ i of water; a dessert-spoonful every five or ten minutes, closely watching effects; or, a quarter or half grain of ipecacuanha may be administered. But, gentlemen, there is a remedy of all others, even not contra-indicated by plethora or other circumstances, which you will find most prompt and decisive in overcoming rigidity of the os uteri or vagina—I mean sulphuric ether, not even to full anæsthesia, but simply with a view of producing a gently lulling influence. I regard it in these cases as the remedy *par excellence*, and, if judiciously used, will fulfil, as it has done for me, your highest hopes.

It will occasionally happen that the os uteri does not respond to the efforts of the uterus; the contractions recur at intervals, but they have not sufficient force; the patient becomes wearied with the abortive efforts of nature; her strength gives way, and the nervous system is much disturbed. Here, then, is a condition of things which must not be misapprehended—do not mistake it for rigidity of the os. The palpable indication is to protect the patient against these mischievous and inefficient contractions—administer an anodyne, which will cause her to lapse into a sweet and refreshing sleep; you will thus have economized her forces, and when she awakes, she will be revived not only in physical energy, but in moral strength.

Second Stage.—When the membranous sac has ruptured, and the liquor amnii escaped, the contractions of the uterus increase in violence, and become decidedly expulsive. It is now proper that you should make an examination, in order to ascertain more specifically the state of things with regard to the fœtus—its true position, and progress. The nurse should attach a sheet to the foot of the bed, so that the suffering patient may grasp it with her hands; with her feet steadily braced, she should, during the expulsive effort, be urged to bear down and assist nature. Generally, a short time after the escape of the waters, a segment of the uterus will be felt between the head of the fœtus and symphysis pubis; and it will sometimes, depending upon the amount of pressure it

has undergone, be more or less swollen. You can be of very material assistance, by pushing this segment of the cervix gently upward during a pain; or if, as is sometimes the case, it should be more toward the rectum than in front, the same thing may be done also in this case. I speak from no little experience, when I tell you that, by this simple manœuvre, if dexterously performed, the labor will oftentimes be most favorably advanced. Again: if there be a sluggishness in the contractions, much benefit will arise from carefully insinuating your finger within the dilated *os uteri*, and titillating it. This, you at once perceive, evokes the reflex faculty of the spinal cord, and imparts vigor and efficiency to the contractions; indeed, the introduction of the finger under these circumstances will act also on a mechanical principle, for the dilatation of the *os uteri* is both vital and mechanical.

It is during the second stage of labor that the patient will complain of distressing pain in her back, causing her frequently to exclaim, "Oh! my back will break; Oh! dear doctor! my poor back; what shall I do?" Great relief will be afforded in these cases, by twisting a napkin, and placing it under the back, the two ends being held by assistants, one on either side; during the pain, they should be instructed to gently elevate the patient, by raising the ends of the napkin, so that firm pressure may be made on the back. This is an old suggestion; I do not recollect to whom it is due, but it is a good one. I often avail myself of it.

As the head of the fœtus approaches the vulva, the patient will feel an urgent desire to evacuate the bowels, and she will insist upon being permitted to leave her bed. This you cannot consent to, for it would, at this advanced period of labor, involve both herself and child in danger. The desire is caused by the pressure of the head against the rectum. Should there be fecal matter in this portion of the intestinal canal, it will, however, be pressed out; but this is matter of no moment, for the nurse, if experienced, will have previously provided a napkin for its reception.

Supporting the Perineum.—The head having approached the *os externum*, the perineum now becomes the seat of extraordinary distension, and the anus itself is more or less open. Support must be given to the perineum in the following manner: the accoucheur will place a piece of folded linen in the hollow of his hand, in order to constitute it a plane surface, and make, during the contraction, a firm and equable pressure, being careful not to have the radial portion of his hand above the inferior commissure; for, in this case, in lieu of supporting the perineum, he would press more or less directly against the head of the fœtus, thus antagonizing the expulsive efforts of the uterus, and, therefore, incurring the liability of rupturing the organ (Figs. 55, 56).

The sufferings of the patient at this period of her parturition are

generally most intense; her shrieks are terrific, and to an unpractised ear will be any thing but sweet music. Do not allow her cries to alarm or perturb you; and while I would not advise you to dry up the fountains of your sympathy in this her hour of dis-



Fig. 56.

tress, yet you must be firm, and at the same time consolatory—giving her every possible encouragement, and assuring her in terms of emphatic kindness, that in a very few moments there will be an end to her tribulation. The accoucheur has much in his power; if



Fig. 57.

he be clever, and comprehend human nature, he can prove the very balm of Gilead to his patient; he can make her faith in him so strong, that it will tend very materially to break the intensity of physical suffering, and remove from her mind the apprehensions of gloom and despondency.

The vulva, during these last throes of the uterus, becomes greatly distended; the head protrudes, and the labia externa are apparently so tightly drawn over it, that you would imagine it almost impossible for the birth to be accomplished without serious laceration. But nature is so conservative that, under ordinary circumstances, the exit of the head is effected without injury to the parts. During the interval of pain, there is usually a slight retrocession of the head. It is not, you must remember, by one sudden and abrupt expulsive effort, that the delivery is consummated; on the contrary, it is through a series of consecutive forces, the necessary tendency of which is gradually to prepare the parts for the distension to which they are subjected, and which, for this reason, they can sustain with impunity.

In these last struggles, just as the head is about making its final passage into the world, the patient will sometimes be attacked with nervous tremblings. They are entirely involuntary, and she has no power for the moment of controlling them. They are of no sort of importance, and need give rise to no disquietude. When the head has thus escaped, there is experienced great relief, and you will be asked in terms of kindness, "Oh! dear doctor, is it all over?" "In one moment, my good patient," you will reply; "the head is delivered, and the rest will occasion you very little trouble." She is soothed by this assurance, and is fortified with hope for the remainder of the birth. It is proper here to remark that, in some instances, as the head is passing through the os externum, and the same thing may occur as it escapes through the os uteri, the patient will lose her consciousness—she will wander, and if it be not recollected that this loss of reason is but for the moment, unnecessary alarm may be excited.*

Does the Cord encircle the Neck of the Child?—There is at this period of the labor an important duty for you to perform; and you must be careful not to omit it. As soon as the head has effected its transit through the vulva, you should immediately introduce your index finger, for the purpose of ascertaining whether or not the umbilical cord, as sometimes will be the case, is around the neck of the child; if so, does it encircle the neck tightly? If it be

* Dr. Montgomery called attention to this temporary loss of mind during labor some years since: "It comes on suddenly during perfectly natural labor, and most frequently at that particular stage of the process—dilatation of the os uteri. It is not accompanied nor followed by any other unpleasant or suspicious symptom; it occurs, perhaps, immediately after the patient has been talking cheerfully, and, having lasted a few moments, disappears, leaving her perfectly clear and collected, and returns no more, even though the subsequent part of the labor should be slower and more painful. In every instance which came under my observation, the patients were conscious that they had been wandering, and occasionally apologized for anything wrong they might have said, although they were not aware of what the exact nature of their observations might have been." [Dublin Journal, vol. v. p. 51.]

loose and exercise no compression, let it alone. Should it, however, be found constricting the neck, you should endeavor to relax it, so that it may be gently drawn over the head. If this cannot be accomplished, and the pressure so great as to cause you to apprehend the death of the child from the impossibility of atmospheric air passing into the larynx and trachea, then, at once, with your finger as a guide, introduce a pair of scissors, and make a section of the cord; or, in the absence of scissors, a penknife will answer every purpose.

Generally, as soon as the head is in the world, the child will gasp, and give evidence that it is alive. Unless something should indicate the necessity for interference, I would advise you to submit the termination of the delivery to nature, except see that the bed-clothes do not obstruct the mouth so as to interfere with the function of respiration; see, too, that the mouth and nose are not obstructed by the membranes.

In a few moments after the expulsion of the head, the uterus again contracts, when the shoulders and entire fœtus are expelled. During the passage of the shoulders, the perineum must be carefully supported. Some practitioners are in the habit, as soon as the head has made its exit, of making traction upon it for the purpose of expediting the delivery. This is, as a general rule, bad practice, for the sudden evacuation of the uterus will be apt to induce inertia and hemorrhage.

It is very essential, the moment the head has passed the vulva, to allow a free access of air to the face of the child, and this can be done without in any way unnecessarily exposing the person of the mother. Infants are, I am sure, oftentimes sacrificed by indifference to this simple but fundamental rule. The physiologist has shown that respiration is dependent upon the excito-motory system; or, in other words, upon the spinal cord. It is an excited act, and the first effort of the new-born infant to breathe is, perhaps, as Marshall Hall has declared, induced by the stimulus of the atmosphere acting upon the cutaneous or terminal branches of the trifacial nerve.

It is not necessary for me to repeat here what I have already mentioned, when speaking of the mechanism of labor, respecting the different movements of the head, shoulders, etc., during their passage into the world. For these details I refer you to Lecture IV.

As soon as the Child is born what is to be done?—But, gentlemen, I am now about to enjoin upon you a lesson, which I hope you will not fail to observe. I regard it as one of the most important connected with your duties in the lying-in chamber. It is this; the moment the child is in the world, place your hand gently upon the hypogastric region of your patient, for the purpose of being assured that the uterus responds to the birth; the evidence of this

response will be, that you will feel the organ gathered, as it were, upon itself, occupying the lower portion of the abdominal cavity, and presenting the feel of a hard, contracted object. In the recognition of this circumstance, your mind is at ease with regard to the fear of hemorrhage. Suppose, on the contrary, instead of this contracted condition of the uterus, you should find the organ *uncontracted, and in a state of inertia, occupying more or less of the abdomen*: this state of things would at once admonish you of the certainty of flooding; and being thus admonished, you would lose no time in staying the current, which, if not promptly checked, will destroy the life of your patient.

The subject of flooding, with its causes and treatment, will be discussed in a future lecture.

Demands of the Infant.—Let us now turn our attention to the infant. As soon as the child has escaped from the uterus, care should be taken to place it transversely as near the vulva as possible, with its back toward the mother; the object being, in the first place, to prevent laceration of the cord; and, secondly, the passage of any discharge from the vagina into the mouth of the child. Should the cord be twisted round the body or extremities of the infant, you must not fail carefully to liberate it.

Usually, if the labor have been auspicious, simultaneously with, or a few seconds after the exit of the child from the maternal organs, it is heard to cry, a proof that the respiratory movement has taken place, and that the infant is now independent of its mother. Under these circumstances, you should place a ligature around the cord, about two inches from the umbilicus, not, however, without previously having assured yourselves that there is no fold of the intestine protruding from the umbilicus, thus constituting a species of congenital hernia. Should there be this fold, it must be carefully pressed back into the abdomen before applying the ligature.

I recommend you to use for this purpose a piece of flat tape, which exercises an equable but firm pressure.* After the ligature

* Dr. Scholer, in speaking of that very fatal affection among new-born infants—*Trismus nascentium*—says that in eighteen children who died of it he discovered inflammation of the umbilical arteries in fifteen, the arteries having been found swollen at the point at which they approach the urinary bladder. The same observer has failed, in all examinations of infants who have died from other complaints, to detect inflammation of the umbilical vessels. I am quite disposed to believe that there is much truth in the opinion of Dr. Scholer, that trismus is caused by this inflammation of the vessels; and, moreover, that the inflammation is owing to the rude manner in which, frequently, the cord is tied; sudden and undue pressure on these vessels by a round string being apt, I think, to excite inflammatory action, which is soon propagated to the vessels in their progress toward the bladder. To avoid this unnecessary constriction, therefore, I recommend you to substitute for the round string a piece of flat tape.

has been properly applied, you should cut the cord a few lines in front of the ligature with a pair of scissors; but, in doing so, be guarded that you do not, in your confusion, amputate a finger or the penis of the unoffending little infant, both of which blunders are matters of record.

You see, gentlemen, I propose but one ligature, while the general practice is to employ two, and separate the cord between them.* For this practice, I can perceive no solid reason; and the argument usually advanced in its favor is full of error, because it is founded upon a false hypothesis. It is alleged that if one ligature be applied, the mother will be exposed to all the hazards of flooding through the untied extremity of the cord. The absurdity of this apprehension I have already pointed out, when describing the anatomical arrangement of the placenta, and the fetal circulation.†

I never, in single births, apply but one ligature, and for the following reasons:

1. Two are unnecessary, because the small quantity of blood, which flows from the untied extremity of the cord, consists merely of the disgorgement of the vessels on the fetal surface of the after-birth, and does not come directly from the system of the mother;
2. This very disgorgement, in my opinion, assists in the more prompt expulsion of the placenta.‡

Transferring the Infant to the Blanket.—When the infant has been separated from its mother, the nurse should be instructed to have in readiness on the side of the bed a warm flannel, or blanket, which is to receive the little stranger. But, remember you are to place it in the blanket yourselves, and not allow the nurse to do so. You may suppose it quite unnecessary for me to state any directions as to the manner in which you are to remove the child; but sometimes very ludicrous scenes have occurred for the want of a little forethought on this subject. If, in your attempt to take hold of the child for the purpose of giving it to the nurse you should, as may be the case, allow it, from awkwardness on your part, to slip out of your hands, you would very justly be exposed to the censure of those around you; or if, to prevent such an accident, you should suddenly press it toward your person, the blunder would, to say the least, wring a hearty laugh from the witnesses to your gaucheries, in seeing your clothes besmeared with the albumi-

* It has been urged by some writers that there is no necessity for any ligature, and this opinion is predicated upon the fact that in the case of young animals there is no ligature, and no hemorrhage. It was Dr. Hunter, I think, who first pointed out the error of this reasoning by showing that the parent, in dividing the navel-string in the young animal, necessarily subjects the vessels to a degree of torsion, which prevents the bleeding.

† See Lectures XVII. and XVIII.

‡ Should there be twins, it would be safe to employ two ligatures because, in this case, there might be an inoculation of blood-vessels between the two placentae.

nous material with which the surface of the new-born infant's body is more or less covered. Then, to prevent any blunder on the subject, you will place the posterior surface of the child's neck in the space bounded by the thumb and index finger of one hand, gently seize the thighs with the other, and in this way you remove it from the mother, and give it to the nurse. It is received in the blanket, and the nurse must be directed to put it, for the present, in some secure place, either in the bed or crib, where it will be out of harm's way. Sometimes, through carelessness, it is placed in an arm-chair. This is a dangerous practice, for it is very apt to be crushed by the weight of some good dame who, in coming into the room, seats herself in the comfortable chair, not knowing that it is already occupied, and that, by so doing, she is intruding upon the little stranger's rights of hospitality; at the same time giving it a pressing welcome which may be anything but salutary to its delicate physical structure.

The Infant does not Breathe.—It will sometimes happen that the infant, when expelled from the maternal organs, does not breathe; and, under these circumstances, it will require prompt and efficient attention. Its want of respiratory movement may be due to various causes—for example, after a protracted labor, in which the head may have been exposed to long-continued and severe pressure, the brain may be so congested as to occasion an apoplectic condition. In such a contingency the cord should be instantly cut, but no ligature applied, for the reason that the safety of the child will depend upon the immediate escape of a small quantity of blood from the untied extremity of the cord; it will be proper, however, to exercise a discreet vigilance that too much blood may not be lost. The moment you perceive the evidences of the congestion to have passed, which will be made manifest by the change in the color of the face of the child, and a return of vitality, then without delay apply the ligature, and arrest the bleeding. I am quite confident that many an infant, coming into the world in this apoplectic state, has been sacrificed from the neglect of this simple but efficacious practice.

The child will occasionally be born in a state of asphyxia—this term I think a bad one, for it does not convey an accurate idea of its meaning. It is derived from two Greek words, *aphuris*, the pulse, and *a* privative, which literally signify without pulse. You see, therefore, that this definition of the word gives but a very inadequate idea of its true import. Asphyxia, in truth, is that condition of system consequent upon impeded respiration, and the respiratory process may suffer derangement from several different causes, and in various degrees. Carbonic acid gas, carburetted hydrogen gas, submersion and strangulation, or hanging, are all so many causes of asphyxia. Again: we may have asphyxia in a case

in which the respiratory process has never been established, and this is occasionally exemplified in the new-born infant. We shall now briefly allude to its management in these latter circumstances.

1. Examine speedily the condition of the mouth, and ascertain whether the larynx be obstructed either by a collection of mucus, or any other substance; if so, remove it without a moment's delay. The best mode of doing this is to introduce into the mouth of the infant the small finger, and by a gentle scoop you will be enabled to clear away whatever may have obstructed the access of atmospheric air to the lungs.

2. If there be no mechanical obstruction, cold water should be dashed on the face with a view of acting on the medulla oblongata, through stimulation of the terminal branches of the fifth pair or trifacial nerves, thus producing a motor influence from the medulla to the respiratory muscles. Should cold thus applied to the face not suffice to accomplish the purpose, then dip the entire body of the child alternately into cold and warm water. This alternation of warmth and cold exercises a very remarkable influence on the cutaneous nerves, by imparting to them a decided stimulus. It is necessary, however, that the temperature of the water be very low and very high—35 and 100 degrees. The trunk and limbs of the infant should be kept in the warm water about one minute, and in the cold water from fifteen to twenty seconds; friction and flagellation should also be employed. If these efforts prove abortive, then recourse may be had to artificial respiration, which consists simply in blowing air from your own lungs into the mouth of the child, using, at the same time, the precaution of closing the nostrils of the child. After each inflation the chest should be gently compressed with the hand, in order that the air may be expelled from the lungs, thus simulating the action of the expiratory muscles.*

The extremities are to be kept warm by means of friction, together with hot flannels or mustard cataplasms, rolled in folds of old linen; and while these points are being attended to, it will be useful

* Dr. Marshall Hall a few years since introduced to the attention of the profession certain rules for the resuscitation of the asphyxiated. These rules are now known as the "*Ready Method*," and have resulted in very marked success. Besides the alternation of the hot and cold bath, etc.—in the use of the bath, the immersion should be *momentary*, and the alternation *quick*—he insists, as one of the prerequisites of success, upon placing the child in the *prone* position, and alternately but rapidly changing it from this position to the side, and vice versa. While in the prone position, slight pressure is to be made along the back and ribs. Dr. Hall deduces the following truths: Experiments innumerable have demonstrated that if the subject be laid *prone*, and pressure be briskly made on the back, there is good expiration; and that, if the pressure be removed, and the body turned on *its side*, and a *little more*, there is good inspiration; that if this pronation and pressure, and this removal of the pressure and rotation be instituted *alternately*, there is good *respiration*.

to throw warm water into the rectum, mixing with the water assa-fœtida or brandy. The stimulating effect of the enema is sometimes followed by prompt and marked benefit. These are the directions, which, under ordinary circumstances, you are to pursue in cases of asphyxia occurring in the new-born infant.

The faculty of resisting asphyxia, that is, of living without breathing, is very much greater in the new-born infant than in the adult; so that if a child should not breathe for an hour, or even much longer after birth, it should not be abandoned as dead, and, therefore, considered beyond remedy. Cases are recorded in which resuscitation has been accomplished by some of the means alluded to, even after the asphyxia had continued for a long time.*

Another important fact is this: a newly-born infant affected with asphyxia, should not be regarded as dead, because its heart has ceased to beat; for it has been demonstrated by Brachet, of Lyons, Josat, and others, that life may be restored after the pulsations of the heart had ceased for more than five minutes.† This ability in the new-born child to resist asphyxia, explains why in cases of death of the mother it may be extracted alive from the uterus, through the Cæsarean process, even after the parent has been dead for a longer period than half an hour. Dr. Brown-Séquard has shown that, in these instances of post-mortem Cæsarean section, if the mother die when the body is quite warm, the life of the child is in more danger than when the body has become somewhat cold previous to dissolution. It is also worthy of being noted, that the asphyxiated infant should not be kept near a fire, for the colder the temperature of the air, the longer can asphyxia be resisted.

* In an interesting article on "the Resuscitation of Children born-still," by Wm. C. Rogers, M.D., of Green Island, recently deceased, published in the *American Medical Monthly*, for February 1860, there is a record, collected from various sources, of twenty-four still-born infants resuscitated by artificial respiration, by baths hot and cold, by frictions, and by Marshall Hall's ready method, applied singly or jointly, from ten to ninety minutes, the average period intervening between birth and the establishment of respiration being *thirty-five minutes, thirty seconds*. In this article, also, allusion is made to the remarkable case reported by J. Foster Jenkins, M.D., of Yonkers, in which the funis was pulseless for twenty-five minutes before delivery, and no attempt was made at respiration for thirty minutes after birth; more than two hours' constant attention was necessary to preserve the child's life.

† This is in direct conflict with the opinion very emphatically expressed some years since by Sir B. Brodie, who wrote: "If the action of the heart, by which the circulation is maintained, should cease, as a consequence of the suspension of respiration, it can never be restored. This I positively assert, after having made it the subject of a very careful investigation." [Lectures on Pathology and Surgery. 1846, p. 81.]

LECTURE XXVI.

The Third Stage of Labor; Expulsion of the Placenta—Mismanagement of Placenta—Dangers of—Function of Placenta, limited to a Certain Period—Natural Detachment of Placenta; How effected—What are the Evidences that the Detachment is going on? What that it is Accomplished?—The Mode of Extracting the Mass after its Separation from the Uterus—Rule to be observed after its Removal—Retained Coagulum and Puerperal Convulsions; Case in Illustration—After Extraction of Placenta, it should be carefully Examined—Retained Fragments of After-birth and Irritative Fever—Traction on Umbilical Cord before Separation of the Placenta—Dangers of—How Detachment of Placenta is to be Aided when Uterus is Lethargic—Circumstances rendering it necessary to extract After-Birth—Its excessive Volume—Spasm of the Os Uteri—Hour-glass Contraction—Morbid Adhesion—Convulsions—Hemorrhage—Opium and *Bella donna*; Difference in their Therapeutic Effects—How long after Delivery of the Child should the Extraction of the After-Birth be Delayed when there is no Complication?—Permanent Retention of the Placenta, and Decomposition of the Mass—Does the Retained Placenta ever become Absorbed?—Convulsions supervening on Retained Placenta; The Indication to be Fulfilled—Convulsions in this Case are Traceable to Irritation of the Uterus, and are of Eccentric Origin.

GENTLEMEN—We are now to speak of the third stage of labor, which consists in the expulsion of the placenta. It is a cardinal error to imagine that, with the birth of the child, the dangers of parturition terminate. So far from this being so, you will discover, when engaged in practice, that some of the most serious complications of the lying-in room are more or less connected with mismanagement of the after-birth—hemorrhage, inversion of the womb, prolapsion of this organ, laceration of the placenta, or umbilical cord, are all so many accidents, most of them fearful in their consequences, resulting from this cause. I think one of the great evils of the parturient chamber is a disposition on the part of the accoucheur to be officious with regard to the delivery of the placenta; as soon as the child is born, he becomes impatient, and proceeds at once to manipulations, which are not only premature and unnecessary, but, under the circumstances, altogether without justification. I have repeatedly witnessed the sad effects of this meddling with nature; and, therefore, I am the more solicitous plainly and distinctly to point out your true duties upon this subject.

Function of Placenta—When Terminated.—The placenta, you must remember, has a function to perform only for a certain

period—this function consists in respiration, absorption of nutritious principles, and exosmosis of excreta during intra-uterine life; when this has been completed, and the fœtus thrown into the world, the office of the placenta has been fulfilled, and it becomes a deciduous mass, which is no longer a portion of the living mechanism, and, therefore, it is ejected. The mode of its ejection by nature is what particularly interests us; and when once thoroughly comprehended, it will induct you into a conservative practice, which cannot but result favorably to your patient, and spare you much unnecessary embarrassment.

Situation of the Placenta.—The placenta, you are aware, is in adhesion with the internal surface of the uterus, usually, as was generally maintained, near the fundus. According to the investigations of M. Naëgelè, Jr., it is found most commonly on the left side; next, on the right side of the organ. In two hundred and thirty-eight cases out of six hundred, the stethoscope indicated the placenta to be attached to the left side; while in one hundred and forty-one cases it was at the right side. In twenty, no sound could be detected; in one hundred and sixty it was feeble, and so diffused as to be uncertain; in seven instances, the placenta was attached to the fundus; in thirteen, to the anterior wall; and in eleven cases, there was placenta prævia. The following are the results of the researches by Dr. Von Ritgen: he ascertains the seat of the placenta by measuring the distance of the rent in the membranes, made by the passage of the fœtus, from the margin of the placenta; in this way he found that the edge of this body rested on the os uteri in twenty-two cases; at one inch in eight cases; between one and two inches in twelve cases; two inches in seven cases; between two and three inches in sixteen cases; three inches in five cases; between three and four inches in four cases; four inches in six cases; between four and five inches in eight cases; five inches in three cases; six inches in six cases; eight inches in three cases. It would, therefore, appear that the placenta is usually attached much lower than is generally believed.*

Natural Detachment of Placenta.—The expulsion of the after-birth is, in a normal condition of things, preceded by its detachment from the uterus, and the manner in which this detachment is accomplished is through the contractions of the uterus itself. Five, ten, or twenty minutes—the time varying from different influences—after the exit of the child, the patient will complain of pain, and the pain will be followed by a slight discharge of blood. These two circumstances—the pain and discharge of blood—are the evidences that nature is engaged in the separation of the placenta. The pain is recurrent, like labor pain—in fact, it is a veritable labor

* Brit. and For. Med. Chir. Rev. ap. 1856.

throe; it is a natural process, and must not, therefore, be interfered with. But what is the evidence that the detachment of the placenta has been completed? A very important question, the solution of which you must thoroughly understand, for it has much to do with the regulation of your conduct on this occasion. Under ordinary circumstances, when the after-birth is completely detached from the uterine surface, it will be found resting over the mouth of the womb, either centre for centre, or a portion of its circumference will be felt, sometimes protruding into the vagina.*

The direct result of the contractions of the uterus, after the expulsion of the fœtus, is necessarily a diminution of its general volume—the organ becomes shorter and narrower, and the *modus in quo* of the separation of the placenta, under the influence of the contraction, is easily explained. Each successive contraction tends to diminish the respective diameters of that portion of the uterus with which the after-birth is in adhesion—but the diminution cannot take place without a consequent detachment of this body, and this is the true exposition of the manner in which the placenta becomes separated. Again: there is another interesting fact connected with this process—the detachment of the after-birth is usually followed by a closing up of the mouths of the utero-placental vessels—and, therefore, under these circumstances, there is no apprehension of hemorrhage.

Removal of Placenta after its Detachment.—There are two extremes, which you are sedulously to avoid in the management of the placenta—the one is premature and officious interference with the operations of nature, the other a hesitation to act when nature has achieved her part of the process, and calls upon you to interpose. This latter remark has special reference to the duty of the accoucheur, after the placenta has become detached from the uterus, *and this organ is found contracted with the after-birth resting over the cervix, or protruding into the vagina.* It often happens that the young practitioner remains at the bedside of the patient hour after hour, expecting every moment the expulsion of the after-birth—this does not take place, the patient becomes alarmed at the delay, and the only consolation she receives is the assurance that it will soon all be right. Another hour elapses, and no expulsion. A consultation is now proposed by the friends—this is of course acceded to, and when the consulting physician

* I have already stated that the detachment of the after-birth is frequently completed as soon as the child is expelled through the maternal organs, and this is the case when the uterus, in response to the exit of the fœtus, is found hard and contracted in the hypogastric region; when thus detached from the internal surface of the organ, and whether resting over the cervix, or partially in the vagina, there will be more or less recurrent contraction, simulating the throes of labor, the contraction being induced partly by the presence of the separated after-birth, it being now a foreign substance in the uterus, and occasioning irritation of its parietes.

arrives, he proceeds like a man who understands his business; he finds that the uterus is contracted, introduces his finger into the vagina, feels the detached mass resting over the os uteri, or protruding into the vagina, and extracts it without delay in the following manner:

The end of the cord being enveloped with linen, he makes two or three twists of it around two of the fingers of one hand, while he introduces the index finger of the other hand (Fig. 58), carrying it up to the mouth of the uterus, if the placenta have not descended into the vagina; this finger then seizes the cord close to the



(Fig. 58.)

after-birth, and makes traction downward and backward toward the sacrum in the direction of the superior strait; when the placenta has escaped from the womb, the extraction is to be made in the line of the axis of the inferior strait, always remembering to withdraw it by rotating it upon itself (Fig. 59), in order that the membranes may be twisted into a cord, which will enable them to resist the pressure of the os uteri as they pass through, and thus there will be no fear of any fragments of them remaining in



(Fig. 59.)

the uterine cavity, which would often result in more or less annoyance to the patient—such as increased and distressing after-pains, and sometimes hemorrhage. When the placenta is found partially protruding through the os uteri, it will, perhaps, be better to seize it with the fingers, and thus bring it away; this mode of extraction will incur no risk of rupturing the cord, which possibly might occur in making traction upon it when the point of its insertion into the placenta cannot be detected by the finger.

Removal of Coagula.—As soon as the delivery of the after-birth has been accomplished, the finger should be carefully introduced into the vagina for the purpose of bringing away any coagula that may be there, and it should especially be ascertained *whether there is a clot keeping the mouth of the womb open*; if so, it must be immediately removed. I have known very great distress ensue to the patient from the neglect of this simple precau-

tion, in consequence of the severity of the contractions induced by the irritation of the clot. In one case which I have now in my mind, I am very confident that the presence of a large coagulum, acting as an irritant upon the os uteri, was the sole cause of convulsions, which were near proving the destruction of the patient. It occurred in the person of a young primipara, of an extremely sensitive nervous organization; she had been in labor sixteen hours, when she was happily delivered of a healthy living son; soon after the expulsion of the after-birth, she was attacked violently with puerperal convulsions, although there had been no approach to a convulsive spasm during the progress of her labor. Her physician, a most worthy and conscientious gentleman, becoming very naturally much alarmed at the supervention of convulsions, requested me to see the case in consultation with him. Before I arrived, she had experienced three severe attacks, and soon after I reached the house, I noticed that she complained of distressing bearing down pain, groaning piteously, and placing her hand upon the region of the uterus, indicating that the seat of her suffering was there. While the uterus was thus contracting, she was again taken with a convulsive movement. It occurred to me that there must be something abnormal about the organ; with the concurrence of my medical friend, as soon as the convulsion ceased, I introduced my finger, and discovered a large coagulum of blood distending and fretting the os uteri; it was immediately removed by gently insinuating the finger between it and the internal surface of the dilated os. The removal of this clot proved a most efficient remedy—for with its withdrawal there was an entire cessation of the convulsions.

Well, you may desire to know what possible connexion there could have been between the convulsions and the presence of the coagulum. The connexion, I maintain, was that of effect and cause. The os uteri became the seat of a positive irritation from the pressure of the clot; this called forth an undue reflex action from the spinal cord, which resulted in the convulsive movement. This is an instructive case, and I hope you will bear it in mind. But, you may ask, in objection to the explanation, why did the convulsions not occur when the head of the child was making pressure on the mouth of the uterus of this delicate and sensitive lady? I reply—the fact that they did not occur, is the most decided evidence that the irritation was not sufficient to produce them.

Examination of Placenta after its Removal.—You should never omit, after the delivery of the placenta, to examine it carefully, in order that you may be assured that no portion has been left within the uterine cavity; it will sometimes be lacerated and divided, so that fragments of it will remain in the uterus. Under such circumstances, it will be your duty at once gently to intro-

duce the hand, and bring these fragments away; a neglect of this rule will oftentimes result in more or less trouble—such as abnormal contractions of the womb, flooding, putrid discharge from decomposition of the fragments, and irritative fever.

Danger of Traction on the Cord.—It is a very common practice among accoucheurs, soon after the child is born, to seize the umbilical cord, and make tractions more or less forcible upon it, hoping in this way to expedite the expulsion of the after-birth. This is bad practice, and should never be had recourse to, until the placenta is detached from the uterine surface, for fear of the following accidents, which are some of the ordinary results of premature tractions on the funis: 1. Breaking of the cord; 2. Flooding from sudden separation of the placenta; 3. Inversion of the womb, pulling the womb inside out, which would be likely enough to ensue, in case the adhesion between the organ and placental mass was sufficiently strong to resist the tractions; 4. Prolapsus, and even procidentia of the uterus.

The rules, just indicated, apply to the management of the after-birth in cases of natural labor, when nature detaches the mass from the uterus, and the duty of the practitioner is limited to its mere extraction.

How the Expulsion of the After-birth may be Aided.—There is one principle, connected with the question now under consideration, which you should keep constantly before you—the detachment and delivery of the placenta, like the delivery of the child, is a natural process, and should not be hurried, but submitted to nature, unless certain circumstances call for the intervention of science. It must, however, be admitted that in some cases in which the contractions of the uterus are, as it were, lethargic, and not sufficient to cause the detachment, the accoucheur, in order to prevent unnecessary delay, can be of signal service; thus, he may place his hand on the abdominal walls, and not rudely, but gently, grasping the uterus, resort to frictions, which will have the effect of stimulating the organ to contraction. As an important, and oftentimes a very efficient auxiliary to the frictions, a napkin saturated with ice-water may be placed over the region of the uterus, or a lump of ice applied directly to the sacrum. This latter alternative will occasionally be followed by very prompt and happy results. In these cases, too, ergot may be administered with advantage.

I have, however, found nothing more efficient in these instances, and I emphatically commend it to you, as deserving both of recollection and trial, than the introduction of the index finger within the os uteri, for the purpose of titillating it; this movement of the finger against the cervix evokes the tributary and important action of the spinal cord, and very readily accomplishes the object you have in view, viz., the contractions of the uterus.

Artificial Extraction of Placenta.—Let us now consider some of the circumstances, which may render it incumbent for the accoucheur to interpose and bring away the after-birth; or, in other words, the circumstances which, making abortive the ability of nature, and, at the same time, compromising the safety of the patient, call for prompt assistance. The following may be enumerated among the more prominent conditions requiring artificial assistance: 1. Excessive volume of the placenta; 2. Spasm of the os uteri; 3. Spasm or irregular contraction of the upper portion of the cervix, or body of the uterus, occasioning what is known as the hour-glass contraction; 4. Morbid adhesion of the after-birth to the uterus; 5. Convulsions; 6. Hemorrhage.

I. *Excessive Volume of the Placenta.*—You will sometimes remark that, subsequently to the birth of the child, notwithstanding the vigorous contractions of the uterus, the placenta does not come away. In these cases, it may be that the cause of the delay is owing to the excessive size of the after-birth, or the increased volume may be occasioned by this body being doubled upon itself, or by an accumulation of coagula, or sometimes of the liquor amnii, pressing down against the after-birth, and causing a sort of sac or pouch to present over the os uteri. How are you to know that the placenta is enlarged either positively or relatively? The diagnosis is not difficult. In the first place, the general volume of the uterus will be greater than under ordinary circumstances; and, secondly, on introducing the finger as far as the mouth of the womb, the after-birth will be felt there in one of two conditions; either with a positive increase in size, or only relatively enlarged. In these instances of increased volume there will, oftentimes, be a protracted and unnecessary delay in its delivery, and the strength of the patient becomes exhausted in fruitless efforts to expel it. The course to be pursued, is at once to introduce the hand, grasp the after-birth, and carefully bring it away.

But never forget one principle—in all cases in which it may become necessary to introduce the hand into the womb for the purpose of extracting the placenta—the principle is this: *Do not bring away the mass until you find the uterus beginning to contract, otherwise you will expose your patient to hemorrhage.* If, on reaching the os uteri, you should recognise the pouch of which I have just spoken, it should be immediately ruptured for the escape of the coagula or liquor amnii, and thus the difficulty will be removed.

II. *Spasm of the Os Uteri.*—Usually, when the child has passed into the world, the mouth of the womb will be quite soft and relaxed, offering little or no resistance to any attempt, which may be made to introduce the finger within the cavity of the organ. But you will sometimes observe a departure from this state of things; in

lieu of relaxation, there will be such a contracted condition of the *os* as to render it extremely difficult to penetrate it; the contraction is irregular and spasmodic, occasioning more or less suffering to the patient, and preventing, of course, the expulsion of the placenta. These are the cases which so frequently lead to embarrassment on the part of the accoucheur; the womb contracts, the female suffers intensely, but there is no progress in the delivery of the after-birth. Patience, on all sides, is about exhausted; the doctor is puzzled, and he is, indeed, *in nubibus*. The question very naturally arises, is there any necessity for the embarrassment? I tell you, gentlemen, there is none at all. If you will ascertain that there is some cause at work to interrupt the scheme of nature, and what that cause is, you will have no great difficulty, under ordinary circumstances, in applying the appropriate remedy. Suppose, then, in attempting to introduce the finger into the *os uteri*, you discover a positive resistance, and that this resistance is much more marked during a contraction; also, that instead of a uniform diminishing of the uterus while under the influence of muscular effort, you find the effect limited almost entirely to the neck of the organ. With this state of things ascertained, nothing is easier than an accurate diagnosis. The whole difficulty is due to *spasmodic contraction*, or, if you prefer it, to *spasm* of the *os uteri*; and this is the true source of the delay in the expulsion of the placenta. Indeed, until the difficulty is removed, it will be physically impossible for this body to have egress. You see, therefore, how important it is for you constantly to keep progress with circumstances, as they may develop themselves in the lying-in chamber. While I am most anxious to impress upon you a profound respect for the consummate ability, which usually characterizes nature in the discharge of her varied functions during the parturient struggle, yet you must not be delinquent in early detecting any obstacle, which, while it may bid defiance to all natural effort, will the more urgently indicate the necessity of prompt action on your part.

Well, how do you manage a case of spasm of the *os uteri*? Some practitioners are in the habit of recommending, in a sort of stereotyped way, opium, as the great remedy in these cases. Opium, gentlemen, is one of the most precious weapons with which we may hope to repel disease; but if it be precious and efficient, when judiciously administered, it is equally injurious and fatal if given when its use is contra-indicated. One of the therapeutic characteristics of this drug is, that it tends to cerebral congestion; another, that it stimulates, through centric influence, the spinal cord; another, that it constipates. Would it not, therefore, be madness to resort to opium as a primary remedy in cases of plethora; and would it not be equally improper when the trouble with the

patient is habitual constipation? So much for the routine employment of this remedy.

But we have in belladonna an efficient therapeutic agent for the difficulty in question; and it is interesting to know the *modus in quo* of its action. You might, perhaps, suppose that this remedy would be contra-indicated, for the reason that one of its essential attributes consists in its power of inducing muscular contraction. Its efficiency, however, in spasm of the os uteri is due, in the first place, to the fact that it diminishes the sensibility of the parts with which it comes in contact; and, secondly, it lessens the reflex power of the spinal cord. The spasm of the os uteri, remember, is a reflex spasm. Have prepared an ointment of belladonna, $\frac{3}{4}$ i. of the extract to $\frac{3}{4}$ i. of lard—let the os uteri be freely smeared with it, and, at the same time, attempt gently to introduce the finger within the mouth of the organ—if you succeed in this latter effort, which, with proper perseverance, can generally be accomplished, my advice is to allow the finger to remain there for some time, with a view, as it were, of fatiguing the muscular fibres of the part, and thus breaking up the spasmodic or irregular contraction. I have much confidence in this latter procedure. Indeed, I have in some instances succeeded, without recourse to any other means, in overcoming the spasm by careful insinuation of one finger after another into the os uteri.

An important remedy, also, in these cases, will be tolerant doses of ipecacuanha; say $\frac{1}{4}$ to $\frac{1}{2}$ a grain every fifteen minutes, as circumstances may indicate—it has, at times, a powerful effect in producing relaxation, and I regard it as one of the most certain of the antispasmodic agents. If the patient should be vascular, with a rigid muscular fibre, and a bounding pulse, the lancet will prove a resort of great efficacy. Take from the arm $\frac{3}{4}$ vi., $\frac{3}{4}$ viij., or $\frac{3}{4}$ x. of blood, as the peculiar state of the case may justify. When the spasm is removed, then, if there should be any delay in the delivery of the placenta, the proper plan to be pursued is to introduce the hand, grasp the after-birth, and extract it. It is quite rare in these instances of irregular contraction of the uterus to have, as a complication, hemorrhage; but, in such an event, especially when the hemorrhage endangers the safety of the patient, the pressing object is to arrest it; the remedies for this purpose we shall speak of in the succeeding lecture.

III. *Spasm, or Irregular Contraction of the Upper Portion of the Cervix or Body of the Uterus—Hour-glass Contraction.*—This is a peculiar condition of the organ, to which it is necessary to make some brief allusion. It consists essentially in such an abnormal contraction as to occasion, in some portion of the long axis of the uterus, a narrowing—usually occurring at the upper extremity of the cervix, or in the body. This narrowing necessarily divides the organ

into two compartments or chambers, and hence it has been, with some propriety, denominated the *hour-glass* contraction (Fig. 60).

It is not uncommon, when talking with a young physician, who has not been particularly fatigued by an extensive practice, to hear him exclaim, in speaking of a case of midwifery, which he may have attended: "Well, sir, I had a hard time of it the other day; I had a case of hour-glass contraction, and it bothered me extremely, but I succeeded at last in getting through with it." This language is not, perhaps, so much the language of boast, as it is of erroneous judgment. He no doubt supposed that he had veritably a case such as he described, and if you take these not unfrequent recitals of the inexperienced accoucheur as a basis of opinion, you will very naturally be misled as to the relative frequency of this abnormal condition of the uterus. The more you see of practice, gentlemen, and the more familiar you become with the revelations of the lying-in chamber, the more you will be convinced of the fact—that *hour-glass contraction is comparatively of rare occurrence*. With a fair share of observation in midwifery, and a constant desire to arrive, by rigid analysis, at just conclusions, I can positively assert that I have never met with but five cases of the true *hour-glass contraction*—two in my own practice, and three in consultation. While, however, I am of opinion that it may be regarded as among the rare complications of labor, yet I would guard you against the statement of some writers, who maintain that the assumption of hour-glass contraction of the uterus is altogether without foundation, and that it exists only in imagination. Rare, however, as I believe it to be, it is material that you should understand, should a case of the kind present itself, how to manage it.

The uterus, as I have stated, is divided into two chambers, these chambers being separated by the narrowed or constricted portion of the organ; the placenta is lodged in the upper chamber, while the umbilical cord is found to protrude through the strictured orifice, and thence into the vagina. Now, suppose yourselves by the bedside of your patient—the placenta is retained; you institute an examination for the purpose of ascertaining the cause of the delay; it may be that, not reaching the placenta with the finger carried as far as the os uteri, you will insinuate the hand into the cavity of the organ; then, in your exploration, following the cord you will suddenly come in contact with the orifice or stricture separating the two chambers; you feel the placenta in the upper chamber—in doing so you tremble, a deadly sickness comes over you, and, with



FIG. 60.

an agitation which no one but yourselves can fully appreciate, you withdraw your hand; the nurse, with her searching eye, reads in your haggard countenance that something is wrong. She takes you one side, and in reply to her anxious inquiry you remark—*Oh, nurse, the womb is ruptured!* The good nurse, different from others of her sex, cannot keep the secret, and in a very few moments the household is informed of the melancholy discovery, which your sagacity has enabled you to make! Instantly a consultation is proposed; in a brief time, some man of experience arrives; on examination, he finds that *what you have mistaken for a rupture of the uterus is nothing more than the opening resulting from the division of the organ into two compartments!* Why do I, in this familiar manner, call your attention to this point? It is because I am solicitous to guard you against so grave a blunder in diagnosis, and at the same time to admonish you that, without adequate discrimination, feeling the placenta in the upper chamber might lead you to suppose that, through a laceration of the organ, it had escaped into the abdominal cavity. A moment's reflection would serve to show you the error of such an opinion—for remember, that when the uterus undergoes rupture during parturition, the evidences of this appalling complication are, not only well marked, but they are almost simultaneous with the accident itself—such as vomiting, pallor, and sinking of countenance, cold perspiration, with a rapid and flickering pulse.

The treatment of hour-glass contraction consists in a resort to remedies calculated by their relaxing effects to remove the stricture condition of the uterus, such, for example, as have been recommended in *spasm* of the cervix. As I have already remarked, I have great confidence, with a view of removing this stricture and restoring the uterus to its normal state, in the efficacy of fatiguing the muscular fibres, and for this purpose I would suggest the fol-



FIG. 61.

lowing plan: The hand should be introduced into the cavity of the organ in a conical form, and this form maintained while the hand remains within the cavity; it is then passed up to the constricted portion (Fig. 61); and the fingers, representing the summit of the cone, are made to push gently, but firmly, against the centre of the contracted orifice; equable and continued pressure will thus tend to break the force of the spasm; the stricture is overcome, and the after-birth can then be removed without difficulty. It

will occasionally, however, happen that the hand becomes so severely cramped, and the resistance of the

constricted portion so great, that the accoucheur is under the necessity of withdrawing his hand without accomplishing the object. Under these circumstances, I have on two occasions had recourse to a method, which I do not remember to have seen mentioned by any author, and to which I attach more than ordinary importance. It is this—take a small piece of prepared sponge, of a conical shape, well enveloped in soft linen, and completely saturated with olive oil, or simple cerate; this is to be inclosed in the hollow of the hand, and then introducing the hand into the uterus, the apex of the sponge is applied against the constricted orifice; by firm and properly directed pressure, causing the sponge to act on the principle of a wedge, the spasm is removed, and all difficulty at an end. I submit this method to the test of future trial, believing, as I do, that it will be found, under the circumstances, to subserve very satisfactorily the object in view.

IV. *Morbid Adhesion of the Placenta to the Uterus.*—This is another form of placental complication which, if you are to rely on the statements of the young practitioner, is extremely common. But, gentlemen, my own opinion is that what is truly understood by morbid adhesion of the after-birth is to be classed among the very rare occurrences of the parturient chamber. That it will, however, occasionally be met with is unquestionable, and, therefore, there are some points connected with it, which it is necessary for you to understand. It has been by many doubted whether there exists any such thing as inflammation of the placenta—placentitis. But the unerring demonstrations of the pathologist have abundantly shown that the after-birth will sometimes become the seat of inflammatory action, exhibiting both an acute and chronic type. One of the results of inflammation, as you well know, is an effusion of coagulable or plastic lymph; and it is now very generally conceded that this lymph is the special medium through which the morbid adhesion of the placenta to the uterine wall is effected.

The adhesion may be partial or complete. In the former instance, in consequence of a separation of a portion of the placenta from the uterus, there will be more or less danger of hemorrhage. When, however, the adhesion is complete, there will rarely be hemorrhage unless the uterus be in a state of positive inertia, and even then the bleeding would be comparatively slight, for the reason that the mouths of the utero-placental vessels would be protected by the contact of the after-birth. This latter may be in cohesion with any portion of the uterine surface, depending upon the particular point of its original insertion.

How do you know that morbid attachment really exists? One of the evidences will be the fact that, notwithstanding the contractions of the uterus, the placenta is not expelled. This alone is a very feeble evidence, for the non-expulsion of the mass, in obedience

to the contractile efforts of the womb, may be due, not to morbid adhesion, but to one of the conditions which we have already examined, viz. Increased size of the placenta, spasm of the os uteri, or the hour-glass contraction. You see, therefore, you must have some more reliable testimony. That the delay is not caused by excessive volume of the after-birth, you learn from its absence over the mouth of the uterus; that it is not spasm of the os will be manifest from the facility of introducing the finger; and that there is no hour-glass contraction is ascertained by the non-existence of the symptoms characteristic of this condition.

The most certain evidence, I think, for an accurate diagnosis with regard to morbid adhesion of the placenta will be as follows: 1. The uterus will be found presenting to the hand applied to the abdomen a larger volume than when the after-birth is detached, and remains within the cavity of the organ; 2. The failure of repeated and vigorous contractions to separate the after-birth; 3. On introducing the hand into the cavity of the uterus, and following the umbilical cord as a guide, the placenta will be distinctly felt in connexion with the womb, either partially or completely. Having thus made up your diagnosis as to the real state of things, and ascertained that the delay in the expulsion of the placental mass is occasioned by its morbid attachment, the next point for consideration is—what, under the circumstances, is the course for the accoucheur to pursue? This question is very important as well as interesting, and deserves attention.

The plan to be adopted will depend upon whether or not there is hemorrhage—in the event of this latter, should it be such as to place in peril the safety of the mother—the treatment must be prompt and consist of those remedies of which we shall speak when discussing, as we shall do in the succeeding lecture, the subject of flooding. If, on the contrary, there be no hemorrhage, or complication calling for the immediate delivery of the placenta, then, the case being less urgent, there is no necessity for hasty measures. It is well, however, to recollect that, although there may be no pressing motive for the prompt extraction of the after-birth, yet there is a certain limit beyond which it would be unsafe to allow this mass to remain within the uterus without resorting to legitimate means for its removal. There is always more or less anxiety on the part of the patient and friends until the delivery of the placenta is accomplished, and until this takes place they do not regard the labor as complete; in this opinion they are right. But, gentlemen, in addition to the anxiety of the patient, there is another reason why it is important that too long a period should not elapse before the extraction of this body.

The placenta, you have been told, is called upon to perform only a limited duty, its function ceasing with the birth of the child. It

then, as a general rule, is separated from the uterus—its vitality soon becomes extinct, and it is converted into a deciduous mass, constituting no longer a portion of the living economy, and is subject, therefore, to the mutation incident to dead structure, viz., decomposition. This latter condition may occur sooner or later, depending upon various circumstances; in the event of such a contingency, the patient would be unnecessarily exposed to great danger.

The rule, which I would suggest, and which experience has proved to me to be the safe one, is not to allow—I am now alluding to cases in which there is no complication indicating prompt interference—more than two hours to elapse after the birth of the child without attempting to bring away the after-birth, and this applies to any case, whether of morbid adhesion, hour-glass contraction, or whether there be an entire absence of any abnormal symptoms. Again: I would enjoin upon you another rule, and, although it may sometimes impose rather a heavy tax on time and patience, yet it will be a wise precaution, may save you much embarrassment, and prove a shield to your patient against serious danger: It is never to leave the chamber after the birth of the child, until the placenta has come away. If two hours should have elapsed since the delivery of the child, and you have discovered that the delay is owing to morbid adhesion; and, if frictions on the abdomen, or titillating the os uteri with the finger, should fail in inducing contractions sufficient to break up the adhesion, and detach the after-birth, then the broad indication is not to wait any longer, but proceed at once to extract it. With this view, the hand is to be cautiously introduced in a conoid form into the uterus, and following the cord as a guide, it will soon reach the placenta; the other hand should be placed upon the abdomen over the site of the placenta, for the purpose of steadying the uterus. This body will be either in complete adhesion with the womb, or will only be partially so. In the latter case, the fingers should be insinuated, with the dorsal surface toward the uterus, between the latter organ and placenta, commencing at the point of separation. The hand is then made to glide between these two surfaces (Fig. 62), and by gentle manipulation, the detachment may be accomplished. After the placenta has been separated, it should be withdrawn according to the directions to which we have already alluded. Should it, however, occur that the hand cannot detach the body, then it should be brought away in fragments, and at the same time every reasonable attempt made to extract the whole of the mass.



FIG. 62.

When there is complete adhesion, the safer practice, in my opinion, is to introduce the hand, and stretching the fingers over the fetal surface of the placenta, as far as the peripheral edge, gentle traction should be made upon this edge by drawing the fingers toward the palm of the hand; this somewhat simulates the mode in which the uterus, under the influence of contraction, proceeds in the separation.

The plan just suggested is far preferable to that recommended by some authors, viz., to make tractions upon the cord with the hope that these tractions will result in the detachment of the after-birth. The danger of this practice must be quite evident to you, consisting in liability to rupture of the cord, inversion of the uterus, etc. For these reasons, it should not be resorted to, and I trust you will not forget this admonition.

It will occasionally, however, happen that, notwithstanding the best-directed efforts of the accoucheur, these morbid adhesions cannot be broken up; and there is, for a longer or shorter period, retention of the after-birth. This is certainly an unfortunate condition of things; but like many other contingencies in practice, though not of your own choice, yet they are to be managed in the best possible way circumstances will permit. One of the principal dangers of retained placenta, as you have been informed, consists in the decomposition of the mass, and the constitutional disturbances, which are so apt to follow the absorption of the decomposed matter. When decomposition has occurred, much of the material passes off per vaginam in the form of a fetid discharge.*

Absorption of retained Placenta.—Some writers maintain, and among others Nægelè, Salomon, Rigby, and Porcher, that it is possible for the uterus to remove a retained after-birth through the process of absorption; this is the explanation, which is given of those alleged cases in which the placenta has been permanently retained, unaccompanied by any of the constitutional or local evidences of decomposition. You will find in the books several instances recorded of retained after-birth, the disappearance of which from the womb could be accounted for only, according to these writers, on the principle of uterine absorption. I have never known a case of retained after-birth, which was not thrown off, in part, at least, after decomposition, through the vagina in the form of a putrid discharge, when occurring at full time; and I am inclined

* In all cases, whether the placenta has been retained or not, in which, after delivery, the discharge becomes fetid, it is very important to order the nurse to syringe the vagina freely several times a day with tepid water, and the suds made of Castile soap; and, also, the occasional use of the chloride of lime may be resorted to in the form of injection. If this discharge be allowed to accumulate in the vagina, besides its offensive odor, it will produce more or less irritation, and prove excessively annoying to the patient.

to regard most of the supposed examples of permanently retained placenta as apocryphal, for the reason that sufficient care has not been exercised to ascertain whether the mass may not have come away during the absence of the accoucheur, either in a solid or fluid state. Still, there is very high authority on the other side of this question, asserting most positively that cases have occurred in which the placenta has never passed from the uterus, and that its subsequent disappearance was the result of absorption. It may, therefore, be considered an open question—still *sub judice*—to be determined by the accumulation of future evidence.

V. *Convulsions*.—The labor may have progressed and terminated most auspiciously; and, a few minutes after the expulsion of the child, that most formidable complication—convulsions—may ensue, owing to irritation occasioned by the presence of the after-birth.

When we treat in detail of puerperal convulsions in a subsequent lecture, we shall tell you that they may be produced by various causes, and among these, occupying a prominent place, will be uterine irritation, either prior or subsequent to the birth of the child. If, therefore, you should have a case of convulsions resulting from irritation of the uterus, and this local irritation you ascertain to be in consequence of the presence of the after-birth, there should be no doubt or delay as to what is to be done—the *immediate removal of the after-birth is indispensable*. It has, I am sure, often happened that human life has been sacrificed in these cases, by mistaking the true cause of the convulsive paroxysm. I need scarcely remind you that when puerperal convulsions arise from irritation of the uterus, they do so through reflex influence, and are eccentric in their origin.

I may here mention that, as soon as the placenta is removed, it will be proper, with a view of calming the irritability of the uterus, to introduce an opium suppository, consisting of one or two grains of the drug, into the rectum, or from forty to fifty drops of laudanum in half a tumbler of tepid water may be used as an enema. *Belladonna* ointment applied to the os uteri and vagina will also render important service.

VI. *Hemorrhage*.—In the succeeding lecture, we shall speak of the management of the placenta in connection with hemorrhage.

LECTURE XXVII.

Management of Placenta in Flooding after the Birth of Child—Frequency and Mortality of Flooding—Statistics—Dangers of Post partum Hemorrhage—What is Post-partum Hemorrhage, and how produced?—How is this form of Flooding divided?—External and Internal Flooding—Causes and Diagnosis of External Hemorrhage; how distinguished from Internal—Duty of the Accoucheur the instant the Child has escaped through the Vulva—Treatment of External Hemorrhage; the entire object is to produce Uterine Contraction—How is this to be accomplished?—Ergot not to be relied on as a Heroic Remedy in Perilous Flooding—Why?—The Tampon; objection to its use in Post-partum Hemorrhage—Pressure and Cold the two Reliable Remedies in Uterine Hemorrhage—the Cold Dash; action of—A small piece of Ice introduced into the Vagina; its reflex influence—Mammæ and Uterus—Sympathy between and Deductions from—Pressure of the Abdominal Aorta—Electricity as a Remedy in Hemorrhage; Objections to—Injections of Vinegar, Lemon-juice, etc., into Vagina, bad practice—Internal Uterine Hemorrhage; how treated—Cephalalgia from Profuse Losses of Blood; how treated; how distinguished from Phrenitis—Transfusion as an Alternative after Excessive Hemorrhage—Dr Blundell first to resort to it in the Puerperal Woman—Average Success of the Operation—Prof. Edward Martin, of Berlin—How does Transfusion accomplish Reaction?—Is it by the Quantity of Blood transfused, or by stimulating the Walls of the Vessels and Heart?—Brown-Séquard's Experiments; Deductions from—Secondary Post-partum Hemorrhage; what does it mean?—Treatment of Secondary Hemorrhage.

GENTLEMEN—Next in order of consideration is the management of the placenta in cases of hemorrhage or flooding. In discussing the question of hemorrhage, we shall limit ourselves, for the present, to that form of it which occurs subsequently to the birth of the child. It has been remarked by a writer on midwifery, that no physician should have the hardihood to cross the threshold of the lying-in chamber, who is not prepared promptly and efficiently to render the needed service in the moment of peril. This is the language of that emphatic, lucid, and practical author, Dr. Gooch. I respond most heartily, with all consciousness of its truth, to the value of the sentiment; and I would say to those who have never yet been engaged in the practice of the profession, that if there be any one thing more than another, in the whole routine of professional duty, calculated to strike terror into the heart of the practitioner, it is a case of flooding after the birth of the child. One moment of hesitation or doubt, and death speedily terminates the scene. Nature has opened her flood-gates, and, if they be not instantly and skilfully closed, all chance of rescue is at an end. There is no time for

consultation here—no time for the perusal of books to see what is to be done—that inexorable enemy Death is pressing for his victim; and, but for the prompt interposition of science, the chamber of sickness will be converted into the gloom of desolation and heart-stricken grief.

I wish I had the power to portray, with graphic truth, the lying-in room in a case of perilous flooding. There is your patient, she who has confided her life to your custody—she is delivered of a healthy, living child—her heart is full of a mother's love—and, while extending to you the sincere oblation of her thanks, and, perhaps, in the very act of receiving the tender congratulations of her happy and devoted husband, she is struck with sudden pallor—the gentle smile and beaming eye have given place to the sunken and ghastly cheek; she is speechless and unconscious; she knows not the countenance of the agonized husband, who bends so fondly over her; his voice, once so familiar and welcome, falls without its echo; in a word, that woman is moribund. And all this change is but the work, as it were, of a few seconds. In this terrible emergency, every eye is turned toward you; the hopes of that husband rest upon your instantaneous action. Overwhelmed and torn with grief, in the agony of his distress, he will exclaim, in tones which will reach the very depths of your heart: "Doctor, doctor, save my wife!" Should you, under this appeal, prove inadequate to the emergency because of ignorance of what to do, that appeal will continue to ring in your ears, it will prove a withering comment on past neglect, and cause you to bewail in tears of blood the fatuity, which urged you thus wantonly to sport with human life. But, on the other hand, if the appeal be made to one, who is not only fully impressed with the sacredness of the obligation involved in the responsibility of ministering to the sick—to one who, when he assumes the cares of the lying-in room, feels that he is competent faithfully and promptly to discharge his duty; and if, in the exercise of his knowledge, he rescue the patient from her impending danger, and restore her to her husband and child, then he will have accomplished one of the most glorious of all human triumphs.

In these scenes of distress you must be careful not to permit the heart to exercise a sovereignty over the mind; it is here that the heart of the physician must, for the moment, close up its fountains of sympathy. There will be no time for you to commingle your tears with those of agonized friends; your duty will be to arrest the work of death. The danger is imminent; the friends are gathered round the couch of the dying relative; their sobs penetrate the inmost recesses of your soul; and, in looks which cannot be misinterpreted, they say that you are the only being under heaven on whom their last hope depends! It is in instances like these that promptness, decision, and energy must take the place of

sympathy; and although your promptness may subject you to the charge of being rude, and your decision be mistaken for temerity, yet, if this promptness and decision will enable you, under these trying circumstances, to save human life, restore a fond mother to her weeping children, or a beloved wife to her husband, what care you for the construction, which a selfish and heartless world may place upon your conduct?

Frequency and Mortality of Flooding.—The following statistics from Dr. Churchill will enable you to appreciate the frequency and fatality of hemorrhage in childbirth; under its three forms, viz. *post-partum, accidental, and unavoidable*.*

In 163,738 cases, hemorrhage occurred 1338 times, or about 1 in 122; out of 782 cases of hemorrhage, 126 mothers were lost, or about 1 in 6; out of 944 cases, 288 children were lost, or about 1 in 3.

Further: out of 218 cases of accidental hemorrhage, 32 proved fatal, or 1 in 6; out of 261 cases of unavoidable hemorrhage, 71 proved fatal, or nearly 1 in $3\frac{1}{2}$; and out of 365 cases of flooding after delivery, 25 proved fatal, or about 1 in 14.

Flooding—What does it Mean?—Before speaking of the remedial agents to which you are to resort in order to arrest flooding, after the delivery of the child, let us first enquire what is flooding, or, in other words, how is it produced? This is a very important question, and it is absolutely essential that you should have no loose or undefined notions upon the subject, but positive and accurate knowledge. Well, when a woman has profuse hemorrhage after the expulsion of the child from the uterus, it is because this organ is in a state of relaxation—a state known as *inertia*. When *inertia* of the womb exists, the utero-placental vessels, instead of being closed, as they become under the influence of uterine contraction, remain open; it is these very vessels, which constitute the flood-gates to which we have alluded, and through which the life-current of the female is so rapidly, and, if not checked, so fatally passing. You see, therefore, if it be true—and there is no fact better established—that flooding is the necessary result of inertia of the uterus, if there be any force in logic, the irresistible deduction is—that the only means of arresting the hemorrhage is *to make the uterus contract for the purpose of closing the mouths of the utero-placental vessels*. I wish you constantly to keep this broad fact before you, and you will find that, under its full appreciation, the dangers and anxiety connected with a case of uterine hemorrhage will be very much diminished.

Divisions of Flooding.—As I am desirous of placing this whole subject of *flooding* before you in the simplest possible manner—

* *Churchill's Midwifery*, fourth London ed., p. 468.

stripping it of everything that is adventitious, and reducing it to a positive tangibility—before *telling* you *how* you are to cause the womb to contract, I wish to call your attention to two very essential divisions of *post-partum* hemorrhage—divisions which you will recognise at the bedside, and without a clear knowledge of which it would be utterly impossible for you, with any hope of success, to attempt to afford the required relief.

The divisions to which I allude are: 1. External hemorrhage; 2. Internal hemorrhage. When the hemorrhage is external, the blood passes from the uterus into the vagina, and thence into the world. When, on the contrary, it is internal, the blood does not pass out of the uterus; it is retained there because of some occlusion of the mouth of the organ—the occlusion being caused either by the detached placenta resting over the *os*, or the presence of a coagulum of blood. Now, the point for you to remember—and on its recollection may depend the life of your patient—is that, whether the hemorrhage be *external* or *internal*, it is produced by the same cause, viz. *inertia of the uterus*; and, moreover, it is equally dangerous, for the reason that the blood is derived from the same source—the utero-placental vessels.

1. *External Hemorrhage*.—You have just been told that in this form of flooding the blood passes from the uterus through the vagina, and, therefore, you know that it exists from this latter circumstance, as also from the exhausting effects which it soon occasions to the general system. One of the most certain elements of success in the management of uterine hemorrhage is a knowledge of its very inception. When death ensues from this cause, it does so very promptly; and, without proper vigilance, the work of destruction will be more than half accomplished before the accoucheur is aware that danger is at hand. Let us suppose, by way of illustration, that you are engaged in a case of midwifery; things have progressed favorably, the child is born, the mother is most happy, the nurse full of merriment; in a word, there is, for the moment, a little gala scene in the lying-in chamber. You apply the ligature, cut the cord, surrender the infant to the nurse, and, taking for granted—it is too often a fatal assumption—that everything is as it should be, you seat yourself by the fire, have your joke with the good nurse, who is complimenting you upon your skill, when all of a sudden your attention is attracted to your patient; she, who a few minutes previously was calm and happy, and full of thanks for your kind ministrations, is moribund! Without the slightest suspicion on your part of such a melancholy episode, you find the poor woman, who relied on you to conduct her safely through her confinement, exsanguinated, bloodless, and absolutely *in articulo mortis*! You become bewildered by this sudden and unexpected change; reason totters, judgment is worthless; at

the very moment when, of all others, you should be firm and collected, you are reduced to a mere machine, without thought to guide you. Under these painful circumstances, death triumphs, and revels with scornful mockery at your imbecile pretensions to check his progress. There is nothing, gentlemen, exaggerated in this picture; it is but too faithful a daguerreotype of many a sad scene in which the heartstrings of affection have been broken, and the domestic hearth converted into a domicile of unutterable grief.

In order, therefore, to guard against this surprise, and be prepared to apply the proper remedies the instant the hemorrhage commences, remember and scrupulously carry out the rule I gave you, when speaking of your duties during the passage of the child through the maternal organs, viz. *the moment the child has made its exit into the world, place your hand on the hypogastric region of the patient, with a view of ascertaining whether or not the uterus is contracted; if so, you need have no fear of hemorrhage; if, on the contrary, it be not contracted, but is more or less flaccid, this is an evidence of inertia, and therefore hemorrhage ensues.* Under these circumstances, instead of permitting time to pass, so precious for the safety of your patient, you proceed without delay to arrest the bleeding by having recourse to the means most efficient in bringing on uterine contraction, and consequently removing the *inertia*.

Treatment of External Hemorrhage.—Flooding may occur when the placenta is completely or partially detached, and yet within the uterine cavity, or after this mass has passed from the organ. It is a very singular fact that many practitioners imagine the *sine quâ non* of success, in the management of hemorrhage, to be the removal of the placenta; and hence in these cases the very first thing attempted is to extract this body, under the impression that with its delivery the flooding will cease. There never was a more perfect delusion. Why, gentlemen, the after-birth, in strict truth, has nothing to do with the hemorrhage, it is not a bleeding surface, and whether it be within or without the uterus is a matter of utter indifference, so far as the great object is concerned—*the inducing uterine contraction*. The practice is founded upon vague and indefinite notions with regard, in the first place, to the true cause, and secondly, to the true source of the hemorrhage.

Ergot.—Another frequent, and, in my judgment, oftentimes fatal error, is to rely on the action of *ergot*; hence, as soon as it is ascertained that hemorrhage exists, this remedy is resorted to under the conviction that it will provoke contraction, and thus arrest the flooding. The cardinal objection to this practice is, that although *ergot* does unquestionably exercise a positive and marked influence on the muscular action of the uterus, yet its effects are not immediate; frequently, ten, fifteen, and twenty minutes elaps-

ing before there is the slightest therapeutic manifestation. With this agent, therefore, as the sheet-anchor of hope, death will often ensue before the remedy acts; and I have no hesitation in saying to you that *ergot* should not be classed among the heroic agents in the treatment of uterine hemorrhage after the birth of the child. There can be no harm in administering it, but do not let it take the place of other and more reliable means, to which we shall presently allude.

Tampon.—Again: there is an unfortunate and far too common belief that the great remedy for hemorrhage is the *tampon*; with this conviction, many physicians have recourse to it the moment they are aware that flooding exists. The vagina is immediately plugged up, and in order to make matters doubly sure, a T bandage is employed for the purpose of retaining the tampon *in situ*. With the slightest possible reflection, the absurdity of this practice as a remedial means, under the circumstances, must be too apparent to need comment, for do you not at once perceive that it can have no effect whatever in producing the only thing that will arrest the bleeding—contraction of the uterus?

But, gentlemen, there is something more than absurdity in the application of the tampon in these cases; there is positive danger, which almost always results fatally to the unhappy patient. Look at it for an instant. When the child is delivered, and the tampon resorted to for the purpose of relieving the hemorrhage, the only effect is, by occluding the mouth of the womb, to convert an external into an internal flooding. It is true, the blood ceases to flow through the vagina, and this may afford you momentary consolation, under the erroneous impression that, because there is no longer any external sign of bleeding, therefore, all danger is at an end. Delusive and fatal hope! It will not, however, be long that you will be permitted to indulge in this fiction, for the evidences of exhaustion will be fast accumulating; the strength of the patient becomes more and more dilapidated, and you will soon be brought to a full, but melancholy appreciation of your folly, by seeing her sink at the very time you imagined you were rendering a most essential service! My advice to you is—*never resort to the tampon as a means of checking hemorrhage after the birth of the child*, for the reason that it exercises no possible good in accomplishing the important object in view—the contraction of the uterus—but, on the contrary, its direct and necessary tendency is to convert an external into an internal hemorrhage, thus lulling the practitioner into false hope, and insidiously, but most certainly, destroying the patient; for, as I have already remarked, whether the flooding be internal or external, if it be not checked, the tendency is the same—death.

Pressure and Cold.—Having disposed of those measures, which

have an unmerited popularity, and which are not the measures science can recognise as the weapons fitted for this terrible conflict, I shall now proceed to point out what, in my judgment, are the more reliable and effective means to be adopted. Remember, there is no time for compromise, no time for capitulation—the enemy, with bold front, and intent upon destruction, has laid his grasp upon the victim, and the issue of life or death will be determined by the promptness and character of the resistance.* Therefore, what you are to do, in the management of hemorrhage, is this—introduce your hand,† without a moment's delay, into the uterus, carry it up to that portion of the organ to which the placenta is partially attached, or from which it has been completely separated;‡ with the expanded dorsum of the fingers make gentle but uniform pressure against the bleeding utero-placental vessels, and with the other hand applied to the abdomen, make counter pressure. Should the womb not contract, have recourse immediately to the cold dash—let a pitcher of ice water be thrown from a height—say two feet—suddenly and with impulse upon the abdomen, and repeat it without hesitation should it be necessary.

Such are the heroic, substantial, and common-sense remedies in these cases of desperate hope, and they will often serve you faithfully in the hour of need. As soon as the uterus begins to contract, gather up the afterbirth in your hand, should it be within the organ, and keep it firmly in your grasp until, by powerful contractions, it together with the hand is expelled. Striking benefit will be derived from the introduction of a small piece of ice into the vagina or uterus—the contact of cold, thus suddenly applied, will oftentimes occasion immediate contraction of the organ, by the stimulus imparted to the excitor nerves of the part, inducing the full influence of reflex movement. Injections of iced water into the rectum will also act powerfully upon the uterus through reflex

* It must be understood that I am now speaking of that form of profuse and perilous flooding, which calls for the most positive and prompt measures. It will often happen that there will be a *post-partum* loss in consequence of what may be termed the want of *complete* contraction of the uterus; the organ, although not in a state of general inertia, has not, as it were, properly responded to the birth of the child: and, as a consequence, there may be more or less hemorrhage. In these cases, gentle frictions on the abdomen, the application of cloths wet with cold water to the abdomen, sacrum, and vulva, will usually suffice to control the bleeding.

† It has been objected to this practice of introducing the hand, for the purpose of making pressure, that it will occasion metritis. I have repeatedly had recourse to this expedient, and in no instance has such a result followed. Admitting, however, the force of the apprehension, would it not be better to incur the hazard of inflammation, than to allow the patient to die from exhaustion?

‡ If the placenta be in partial adhesion with the uterus, following the cord will enable the accoucheur to ascertain the particular place of its attachment; if, on the contrary, it should have become separated from the uterine surface, the mouths of the utero-placental vessels will indicate the point of detachment.

agency. Iced water as a drink will occasionally display great efficacy in uterine inertia, causing contraction of the organ, through its impression on the pneumogastric nerve, which is also an excitor of the uterus.

From the well-known physiological relation between the mammae and uterus, it has been recommended, with a view of arresting hemorrhage, to apply the infant's mouth to the nipple, and thus excite an action in the spinal nerves, which is immediately transmitted to the *medulla spinalis*; the latter becoming the seat of irritation, imparts to the motor nerves of the uterus an influence which induces contraction of this organ. This may do in moderate hemorrhage, but it is not to be relied upon in those cases in which life is menaced if the flooding be not promptly arrested.

Compression of the Abdominal Aorta.—Compression of the aorta has been proposed as an efficient means of checking uterine hemorrhage; but it seems not to have met with general favor. Two objections have been urged against it: 1. In women loaded with adipose matter, it will be difficult to make, through the abdominal parietes, the necessary pressure; 2. Compression of the aorta will more or less obstruct the circulation in the vena cava. Let us, for a moment, examine these objections: as to the first, it is undoubtedly true that it will be difficult to press upon the aorta through the abdominal walls of some women; but this certainly has nothing whatever to do with the application of the rule where the objection does not exist; and secondly, with the simple recollection of the relative disposition of the aorta and vena cava—the former on the left, and the latter on the right—it would be quite easy to avoid making pressure on the vein. But admitting the possibility of pressure on the vein (which would never be complete), it would in no way prevent the success of the operation. I, therefore, regard compression of the aorta, provided it be properly made, as a sovereign remedy; not merely as is generally supposed because there is no more blood reaching the uterus, but for another reason which has been demonstrated by the experiments of Dr. E. Brown-Séquard, that there is no more certain mode of producing contraction of the womb than by the arrest of the arterial circulation.

Injection of Cold Water into the Umbilical Vein and Cavity of the Uterus.—It is proper to mention that the injection of cold water into the umbilical vein, in cases in which a large portion of the placenta is still in adhesion with the uterus, has been resorted to successfully; the water should be injected in full quantity. The throwing of cold water into the cavity of the uterus, as a means of arresting hemorrhage, has been seriously opposed under the apprehension that it would result in metritis or peritonitis. On the other hand, we have the authority of Scanzoni,* who says he has employed

* Lehrbuch des Geburtshilfe, p. 509. 1855.

these injections with success in more than one hundred cases, and in no instance was there any evil resulting, or an approach to inflammation either of the uterus or peritoneum.

Various other remedies have been suggested. Electricity, for example, has been much lauded by certain English authorities; but you must at once recognise a very serious objection, which is the delay necessarily connected with its application, simply for the reason that the apparatus is not at hand, and often, before it could be obtained, death will have claimed his victim. I need scarcely caution you against the unjustifiable and dangerous practice commended by some authors, of injecting vinegar, lemon juice, and other irritating substances into the cavity of the uterus; they are all pernicious in their tendency, without a solitary advantage in their favor.*

In brief, I wish to reiterate in the most emphatic manner, that *in cases of perilous flooding, the two great and efficient remedies are pressure and cold*, to be employed as already indicated; and I will further state, that if my experience be worth anything, they will prove, if thoroughly carried out, perfectly trustworthy, even in instances of apparently more than desperate hope. Allow me to remind you that when it has become necessary to resort to refrigerants for the purpose of bringing on uterine contraction, the moment this latter object has been accomplished, and consequently the hemorrhage arrested, *no time should be lost in imparting warmth by the application of bottles of hot water, warm flannels, etc.*, but, in doing this the patient is not to be moved, for the slightest exertion would be likely to produce fainting. Let me here enjoin upon you in cases of exhaustion after flooding, to make it a rule, without an exception, never to permit the patient, even for an instant, to assume the upright or sitting position. More than one example of sudden death from this cause could be recorded, the explanation being that the brain becomes deprived of its blood, and fatal syncope is the result.

Treatment of Exhaustion from Flooding.—We will now suppose that you have succeeded in causing the uterus to contract, and the bleeding is checked. If, with the attainment of these two results, you imagine that the battle is over and victory complete, you will sometimes find yourselves sadly in error; under this delusion, your patient may still sink for want of proper attention on your part. From the excessive loss of blood sustained, her strength will be gone, the vital powers so entirely prostrate that she will exhibit the aspect of a moribund woman—deadly pallor of coun-

* Although we have the high authority of Outrepoint, Kiwisch, and others, in favor, in some instances, of employing a solution of the muriate of iron with the cold water, as an injection into the cavity of the uterus, yet my own opinion is, that the cold water alone will be equally efficient.

tenance, cold surface, no pulse to be detected in the radial or temporal arteries, the beatings of the heart so feeble that they cannot be appreciated. In these cases, which so closely simulate dissolution, there is no time for inaction; every second unimproved for the benefit of the patient is so much abstracted from her chances of restoration. Instead, therefore, of regarding her as beyond relief, and participating in the confusion and sorrow of those who surround her couch, your duty is at once to have recourse to those measures best calculated to produce prompt reaction. For this purpose, the various stimulants are to be employed—brandy, milk punch, strong coffee with laudanum, etc., but a due degree of care is to be exercised in their administration, for remember, after a momentary revival, the patient is again apt to fall into collapse. It is as it were, but the last flickering of the light in the socket, there is but one spark left, and if it be too rudely blown it brightens for the instant only to become for ever extinct. When reaction is established, the strength must be sustained by animal broths, arrow-root, tapioca, jellies, etc. On the other hand, it is not to be forgotten, that the reaction in these cases, growing out of the free use of stimulants, will sometimes be more than the system can sustain, and hence serious congestions may arise requiring prompt attention.

Pressure on the Main Arteries of the Extremities.—After the hemorrhage has ceased, and with a view of rallying the sunken forces, we have a most important remedy in properly directed pressure on the main arteries of the limbs, by means of the tourniquet or hand. In this way a large amount of blood is kept circulating in the principal organs of the body—the brain, lungs, and heart.

2. *Internal Hemorrhage.*—You have been reminded that, when the hemorrhage is internal, it is so because the mouth of the womb is closed up either by the detached placenta or a coagulum of blood, thus constituting what is described as internal or concealed flooding. Whether the hemorrhage be external or internal, the object of treatment is precisely the same—the bringing on contractions of the uterus; and the means for accomplishing this end are also identical. Internal flooding, I have told you, is oftentimes insidious, because there is no blood escaping from the vagina. The practitioner is not apt to suspect that anything is wrong, and the first admonition of danger will be the exsanguinated condition of his patient. But you, who I trust now fully appreciate the absolute necessity of guarding against a surprise of this kind, will not omit to observe the direction of ascertaining whether or not the uterus be contracted after the child has made its escape. It may, however, happen that, notwithstanding the birth of the child, the uterus will still be large, and yet there is no flooding. This may be in consequence of a second fœtus occupying the cavity of the womb, and the diagnosis can be readily made out by carrying your

finger to the os uteri. In the event of a second child, some portion of it will be felt. If, on the contrary, the uterus be enlarged in consequence of being distended by the accumulation of blood—internal hemorrhage—the organ will be found more or less soft on pressure, imparting to the hand a sensation as if pressing upon a pillow, and there will be all the evidences, too, of prostration.

The following case is not without instruction; the recollection of it may serve a useful lesson. It is a sorrowful, melancholy tale, and well do I remember how deeply it affected my feelings, and how freely it caused me to sympathize with those who were the heart-stricken witnesses of the harrowing scene:

Some years since I was sent for in great haste by a gentleman to meet him in consultation in the case of a lady, who had just been delivered of a child. As soon as I reached the house, which was done without delay, he informed me that shortly before my arrival he had delivered the patient of a fine son, and he remarked that there was another fœtus in the womb. Finding his patient growing weak, he thought it advisable to send for assistance. This was all the information I received, when, on being introduced into the room, I witnessed a scene which I have not language to describe. The husband and two female relatives were standing by the bedside of the dying woman; her two little children, who had been asleep in an adjoining chamber, awakened by the confusion, became alarmed, and rushed into their mother's apartment. The moment I beheld the patient I became convinced that all was over! There she lay, pulseless and speechless, with death in graphic letters written on her countenance. In placing my hand on the abdomen, I observed it immensely distended; it was soft on pressure, and in an instant I arrived at my diagnosis; it was a case of *internal hemorrhage*. Without delay, I introduced my hand for the purpose, if possible, of inducing contraction of the womb. The placenta was detached, and rested immediately over the mouth of the organ, thus effectually preventing the escape of blood externally, and leading the practitioner to a fatal error as to the actual condition of his patient. As soon as I had introduced my hand, the unhappy lady seemed to experience a momentary resuscitation; she opened her eyes, wildly gazed on those around, asked for her children, and instantly expired!

Comment here can scarcely be necessary. Error of judgment as to the nature of the difficulty had thus suddenly swept from earth an interesting woman—it had converted a house of joy into one of mourning, and deprived the young and helpless of a mother's love and devotion. Such scenes are indeed agonizing; they are calculated to make a lasting impression on the minds of all, who feel the necessity of accurate knowledge, and the fulness of professional responsibility.

Treatment of Internal Hemorrhage.—The manner of treating a case of internal hemorrhage, I repeat, is precisely the same as when the hemorrhage is external. The hand is to be introduced into the uterus for the purpose of making pressure against the utero-placental vessels. Pay no sort of attention to the detached after-birth or the coagulum of blood, which may be the cause of the occlusion of the mouth of the organ; but carry the hand up at once, pushing the placenta or coagulum one side, and seek for the bleeding surface; and then you are to proceed as has already been indicated when speaking of the management of external flooding.

There is a circumstance connected with profuse losses of blood in the puerperal woman which, in a practical point of view, is of essential moment, and I do not think sufficient value has been attached to it. I allude to two morbid phenomena which may be regarded as the ordinary sequelæ of this anæmic condition of system:

Intense Headache, with Intolerance of Light.—The cephalalgia and intolerance of light are features associated with exhausting hemorrhages in every way worthy of consideration. An error in diagnosis here will be at too heavy a cost, and, therefore, in such cases, a careful judgment should be exercised that the truth may be developed. In order to illustrate this question, and present it to you in the most tangible and practical manner, let us suppose that you have, by prompt and efficient action, safely conducted a patient through an attack of perilous flooding. When you make your first visit the next morning, you find the room in total darkness, and, on inquiring of the nurse why she has so completely excluded the light, she answers: "Oh! doctor, madam has been raving with her head; she says it feels as if a knife were piercing it, and she has made me darken the room because the slightest light almost sets her crazy." You approach the bed, and the suffering invalid, in a feeble voice, requests you to do something to relieve her head. "If I am not relieved, doctor, I shall die." I have more than once heard this very language; now for the point. The two prominent symptoms which occasion so much distress, viz., the headache and intolerance of light, are the very symptoms of phrenitis, or inflammation of the brain. If, therefore, you should make a false diagnosis and imagine that your patient is absolutely affected with this latter disorder, you will proceed with your antiphlogistic course to arrest it. The lancet, leeches, purgatives, and blisters will be called into requisition, and too soon you will discover that you have been attacking a phantom, and the sad penalty of your blunder will be the death of your patient!* The headache and intolerance of light, so far from

* It is well to bear in mind that slight congestion of the brain is not always incompatible with more or less profuse losses of blood; and the vigilant practitioner will occasionally find that, when the exhaustion is not extreme, this congestion may

being the products of inflammation, are the results simply of the exsanguinated state of the system. The indication, therefore, is to restore to the blood its lost albumen by appropriate tonic treatment, such as nutritious diet, small doses of quinine, etc.

In conjunction with this treatment, a most essential object is to calm the irritability of system, revealed by the general restlessness and more or less jactitation of the patient—what she most needs is gentle sleep. The following combination I have found efficient:

Pulv. opii., gr. iii.
Carbonat. ammoniæ, gr. xij.
Extract. hyoscam. gr. xv.
Ft. massa in pil. dividenda, vi.

One pill every two or three hours, as circumstances may indicate.

Transfusion.—It will be proper, in connexion with the question of uterine hemorrhage and its results, to make a few passing observations on the subject of transfusion, which consists in restoring the vital energies by injecting into the venous system of the patient blood taken from another individual. This practice is not of modern origin, for you will find it both spoken of and adopted by some of the writers of the sixteenth century. Dr. Blundell, from numerous experiments on animals, convinced of its efficacy in certain cases of exhaustion, deserves the credit of being the first to resort to this alternative in the puerperal woman, which he did in 1825 with complete success; but in doing so he was not without bitter opposition. There are a number of cases recorded by authors in which life was saved under circumstances where every other effort had failed in bringing on reaction.* When the doctrine of transfusion was first suggested in the sixteenth century, it was supposed

exist, and will yield to the application of two or three leeches to the temples; or, what I have tried with good effect—dry-cupping behind the neck.

* In an interesting monograph on transfusion, which has recently appeared, by Edward Martin, Professor of Midwifery in the University of Berlin, it is stated that there are fifty-eight known cases in which this alternative has been had recourse to in women exsanguinated during childbirth, forty-six of which resulted in complete recoveries, and these instances of exhaustion were such as to inspire no hope whatsoever of success. In most of the remaining twelve cases, the fatal issue was traceable to diseases and occurrences having no connexion whatever with the operation. Professor Martin truly observes that there has been much discussion, and the question is yet unsettled, whether the transfused blood acts by restitution in absolutely supplying the lost blood, or by stimulating the walls of the vessels, and more especially the heart, so as to prolong the activity of the latter until the lost quantity of the vital fluid is otherwise produced. He rather inclines to the opinion that to both of these influences may be ascribed the restorative result; while he thinks, however, the stimulation of the walls of the vessels and heart is the more important, for the reason that the small quantity of blood transfused is altogether inadequate to account for the reaction. It has also been proved that the red corpuscles of the blood are the proper restoratives, although their action is materially assisted by the serum.

that a great boon had been granted the human family ; the old men and women were to find in this expedient more than the philosopher's stone ; years and decrepitude were to yield to this wonderful discovery ; and you will read in the writings of that century directions for rejuvenation—for example, an old man, in order to recover his adolescence and vigor, was advised to suck, after the fashion of the leech, blood from the arm of some youth. With the hypothesis of rejuvenation—about as difficult to accomplish as perpetual motion—you may well imagine the popularity of transfusion, and the wild enthusiasm with which its advent was greeted. But these chimerical notions soon died away, for they had nothing on which to rest but imagination. Not so, however, with regard to the fact—that the throwing of blood from the system of a healthy individual into the veins of a patient, exhausted by hemorrhage, is really a means of saving life.

It was the opinion of Dr. Blundell that, in order to insure permanent success in this operation, it is essentially necessary that blood of the same species of animal should be employed. He found from experiment that a dog, bled almost to death, could recover, even if blood of a mammal of another species be transfused into its veins ; but, after a few days, death always ensues ; while, on the contrary, in employing the blood of another dog, the animal would be permanently restored. Prevost and Dumas have also contended for the same principle, and, indeed, if I am not in error, this was the prevailing doctrine until very recently. That eminent and sagacious physiologist, Dr. E. Brown-Séquard,* who is now so deservedly, through his rich contributions, attracting a large share of attention from the scientific world, has made numerous experiments upon this subject, from which he deduces the following important conclusions :

First.—That arterial or venous blood from an animal of any one of the four classes of vertebrata, containing oxygen in a sufficient quantity to be scarlet, may be injected, without danger, into the veins of a vertebrated animal of any one of the four classes, provided that the amount of injected blood be not too considerable.

Second.—That arterial or venous blood of any vertebrated animal, being sufficiently rich in carbonic acid to be almost black, cannot be injected into the veins of a warm-blooded animal without producing phenomena of asphyxia, and most frequently death, after violent convulsions, provided that the quantity of injected blood be not below one five-hundredth of the weight of the animal, and also that the injection be not made too slowly.

Dr. Séquard observes, the reasons why Blundell, Bischoff, and others, have failed in securing permanent success after the transfu-

* Comptes Rendus. Nov. 1857, p. 925.

sion of the blood of an animal of a species different from that of the transfused one, are: 1. That the blood used was not fresh; 2. That it was in too large a quantity; 3. That it was injected too quickly; 4. That it was too rich in carbonic acid, and too poor in oxygen; the chief cause of failure being the last one, and next to it the quantity of blood.

From his experiments, he has arrived at the conclusion that there is no danger in employing the blood of dogs, cats, and other mammals in transfusion in the human species; and, moreover, he agrees with Dieffenbach and others that defibrinated blood is just as good as blood containing fibrin. Four or five ounces, he thinks, would be as much as would be needed for an adult man or woman. It is not necessary to warm the blood, although it may be useful to do so in some instances. The blood to be transfused, either that of man or mammal, should be received into a large open vase, and immediately whipped, then passed through a thick cloth. If not injected at once it must be either whipped again, or at least agitated, to recharge it with oxygen just before transfusion. The injection must be extremely slow, and if, after two or three ounces are thrown in, there is great increase of the respiratory movements, it will be proper to suspend the operation for ten or fifteen minutes before completing the transfusion.

The middle basilic vein is usually selected for the operation. This vein is laid bare to about an inch in extent, and isolated from the surrounding parts; a small opening should be made on its anterior wall, and the end of the syringe carefully introduced. An ordinary brass syringe, air-tight and in good working order, will answer every purpose.

It is not to be forgotten that one of the essential requisites for the ultimate success of transfusion in cases of exhaustion from uterine hemorrhage is, that the womb must first be in a state of contraction, otherwise all that might be gained by the operation, would be instantly lost through the open mouths of the utero-placental vessels.

Allusion has already been made to the able monograph of Prof. Martin,* of Berlin, and I think I shall render an acceptable service to the reader by incorporating here some of the views of this distinguished observer, touching this interesting question. He thinks the dangers of transfusion have been greatly exaggerated; and insists that only human blood should be thrown into the system of the exsanguinated puerperal woman; on this latter point, it will be seen, he differs from Dr. E. Brown-Sequard. Prof. Martin regards the danger of death from the entrance of air into the vessels as

* On Transfusion of Blood in Puerperal Hemorrhages. By Ed. Martin. Berlin, 1860.

very trifling; nor is he disposed to believe the coagulation of the blood so likely to occur as has been feared by some writers. The instruments employed, and his mode of performing the operation are as follows: A lancet or bistoury for the incision of the skin, and a glass syringe, seven inches in length, which will contain fully two ounces, a slightly curved trocar, four and a half inches long (three of which is handle); the end of the silver canula, receiving the point of the syringe, should be funnel-shaped, and covered with a thin plate of caoutchouc. The operation being decided upon, a strong, healthy, and willing man should be selected, or, in the absence of such, a healthy, resolute female, from whom to abstract the blood; one or more intelligent assistants should be at hand. Having procured a basin with clear, warm water, of 100° to 104° F. and a smooth porcelain cup to receive the blood, let the glass syringe be filled, as well as the cup, with warm water, or immerse the latter in the basin. The median,* or if that be too small, the cephalic or basilic vein should be laid bare, by means of a cutaneous incision extending from one to one and a half inches in length; the trocar is then to be introduced half an inch into the vein, in the direction towards the heart. An assistant should here perform venesection on the arm of the individual, whose blood is to be transfused; while the blood is falling into the emptied cup, which may still be allowed to float in the basin, let also the syringe be emptied of the warm water, and immediately take up with the syringe the fresh blood from the cup, the precaution being observed that the blood in the glass is liquid, and not frothy. Without a moment's delay, place the point of the filled syringe in the canula, which should be firmly held in the vein by a reliable assistant, after removing the stilet, and the piston is then to be slowly pushed inwards. As soon as the syringe is removed, be careful to cleanse it immediately with warm water, unless it be deemed advisable to refill it at once with the still flowing blood, and repeat the injection without delay.

The evidence that the transfusion has been successful will be disclosed by examination of the pulse and heart, together with the general aspect of the features; should, however, this evidence not be complete, the operation is to be immediately repeated, not forgetting to observe that there are no coagula either in the syringe or canula. Having transfused the necessary quantity of blood, the canula should be removed from the vein, and the wound dressed precisely as after ordinary venesection.†

* As it is not always easy to find the median vein, it being collapsed in the exsanguinated woman, it may sometimes be necessary to look for it in both arms; and instances are recorded in which transfusion, without injurious consequences, has been performed successively on both arms.

† Summary of Foreign Medical Literature in the American Medical Monthly, Jan., 1861. By L. Elsberg, M.D.

Secondary Hæmorrhage.—There is a form of hæmorrhage connected with childbirth, to which as yet I have made no special allusion. It may occur, at any time after delivery, from two hours* to two or three weeks, and has received the name of "Secondary Hæmorrhage." Some authors have given a much greater latitude of time to this character of flooding, and mention instances in which it has taken place as late as two or three months after the expulsion of the fœtus. But these latter cases should not, I think, be regarded as connected with the delivery. Their more appropriate place would be under the head of passive hæmorrhage. When "Secondary Hæmorrhage" occurs, it will generally be traceable to some portion of the membranes, placenta, or a coagulum of blood having been retained in utero; in these cases, the first thing to do is to ascertain which of these causes may exist.† If it should be discovered that the flooding is due to one or other of them, the indication is to remove the substance, whatever it may be, and with its removal the hæmorrhage will usually cease. Again: the bleeding may be the result of an atonic condition of the uterus, not amounting to positive inertia, but occasioning a partial flaccid state of the organ, giving rise to hæmorrhage. Under these circumstances, you may administer, with much confidence, ergot; for here the flooding is not so profuse as to require the more heroic treatment of which we have spoken; in connection with the ergot, a capital remedy will be the injection into the rectum of half a pint of cold water night and morning. In plethoric women, the bleeding will be sometimes due to congestion of the uterus.‡ In these cases, it will be of signal benefit to abstract a few ounces of blood from the arm, administer saline cathartics, and keep the patient upon strictly abstemious diet.

In every case of "secondary hæmorrhage," after the uterus has

* In some instances, after the uterus has contracted subsequently to the birth of the child, it will become relaxed, the effect of which will be more or less bleeding. These, although exceptional cases, should not elude the vigilance of the accoucheur.

† The presence of any of these substances in the uterus will not only give rise to secondary bleeding, but will often elude the attention of the accoucheur. Hence the necessity of more than ordinary vigilance, in order that the true cause of the hæmorrhage may be promptly detected. I have on more than one occasion been called to cases of this kind, in which the patients have been nearly exhausted from the gradual oozing of blood; as soon as the substances were removed, the hæmorrhage ceased. Dr Collins, and Madame La Chapelle, have both recorded examples of bleeding, commencing eight and ten days after delivery, occasioned by coagula in the uterus.

‡ Some writers have attributed the bleeding, under these circumstances, to what they have denominated a peculiar *molimen hæmorrhagicum* of the uterus, and, in these cases, the bleeding may occur without the slightest inertia of the organ. The uterus, under the influence of this hæmorrhagic *molimen*, will be found *soft, but not distended with blood*. These latter conditions may be regarded as pathognomonic of this state of the organ.

been cleared of the fragments of placenta, membranes, etc., which may have remained in it subsequent to delivery, I would advise as an efficacious remedy, the application of the child to the breast, for the reason that this, through reflex influence, will impart to the uterus a marked tonicity.

You will read with much interest and profit an excellent paper on the subject of "Secondary Hæmorrhages," by Dr. McClintock, of Dublin.*

* *Dublin Quarterly Journal*, May, 1831.

LECTURE XXVIII.

Management of the Puerperal Woman and her infant, during the Month—Application of the Binder; rules for—Object of the Binder; napkin to the vulva—Stimulants not to be administered to the newly delivered Woman; why?—Ablution of the infant; rules for—Dressing of the Umbilical Cord—Examination of Infant to ascertain Existence or not of Deformity—Toilet of the Child; pins not to be used—After-pains; how managed—Anodynes and Individual Idiosyncrasies—Bed-pan; motives for its use—Physicking and Cramming the Infant; Objections to—Argument from Analogy—When should the Child be put to the Breast?—Colostrum; uses of Meconium—A Flat Nipple; how remedied—First Visit after delivery; when to be made—What the Accoucheur is to do at this Visit—Retention of Urine; how managed—Retention and Suppression; difference between—The Catheter; mode of introduction—Obstacles to Passage of the Catheter; what are they?—Incontinence of Urine; causes of—Vesico-vaginal, and Urethro-vaginal Fistulae—the Lochial Discharge; what it is; derangement of—When Infant cannot take the breast, how to be Nourished—Substitute for the Colostrum—Retention of Urine in Infant; causes of; Milk in Breasts of new-born Infants—Gubler's Observations—Milk Fever—Blot's Researches on Diminution of Pulse in Milk Fever—Constipation of Infant; causes of—Occlusion of Anus; how managed—Purulent Ophthalmia; causes of—Sore Nipples—Mammary Abscess—Paraplegia; causes of in recently delivered women—Sloughing of Umbilical Cord—Pain in Uterus when Child is put to the Breast; Explanation of—Thrombosis of the Vulva—Weed or Ephemeral Fever

GENTLEMEN—The management of the puerperal woman, after the birth of her child, is an interesting, and, at the same time, a very important subject. It is, however, so closely interwoven with the management of the new-born infant that I deem it more expedient, instead of discussing the two questions under distinct heads, to present them to you conjointly; and, with this view, we shall now proceed to point out the wants of the lying-in chamber, during the month.

Application of the Binder.—As soon as the after-birth is removed, and the uterus contracted, the abdominal bandage should be applied. Some practitioners are in the habit of using the *binder*, as it is termed, the moment the child is in the world. There is no advantage in this practice, but much inconvenience, especially when there is delay in the expulsion of the placenta, for, in these instances, it will oftentimes become necessary to remove the binder, and thus subject the patient to additional annoyance. The bandage should consist of a double fold of linen about fourteen inches wide, and sufficiently long to encircle the body twice. The object of applying it at all is simply to afford gentle and equable support to the abdominal parietes, which have been in a state of great distension; and now

that the child has left the uterus they are, on the contrary, in a remarkably relaxed condition. I am generally in the habit of attending myself to the first adjustment of the bandage; it is a simple matter, but still there is sometimes harm done for the want of proper care in its application. The patient should not be permitted to make the slightest effort to assist in the arrangement of the binder; she should be turned on her back, and the bandage rolled up; you then unroll a small portion of it, which with your hand you gently insinuate under the back of the patient next to the naked body, at the same time instructing the nurse to stand at the opposite side, and draw that portion of the binder toward her. In this way, without in the least disturbing the lady, you have succeeded in the first part of the operation; the bandage is then to be arranged so that it comes down well over the hips, and after encircling the body twice with it, it is to be attached by means of pins. The almost universal fault with nurses is, that they draw the binder *too tight*, and unfortunately this is oftentimes owing to the directions of the patient herself, who is most anxious that her beautiful figure should be preserved. Little does she think that this earnest solicitude for the preservation of her fine figure may cost her the destruction of life, the undue pressure thus exercised on the uterus sometimes giving rise to inflammation, which, in rebellion to the best directed efforts, frequently terminates in death.

Napkin to the Vulva.—When the bandage is arranged, the next thing is to have a warm napkin applied to the vulva, for the purpose of protecting the patient against the discharge which, in more or less quantity, will necessarily pass from the uterus. And here allow me to inculcate upon you the recollection of a good rule—let the nurse occasionally, before you leave the chamber, examine the napkin, and tell you whether the discharge is right, or whether it is too profuse. The recollection of this will sometimes save you much trouble, for, although the uterus may be contracted, yet there may be too much *oozing* occasioned by some of the causes to which I have already referred. The course for you to pursue, under the circumstances, is to proceed at once to ascertain what the true difficulty is, and remove it.

If the patient be confined on a cot, I do not suffer her to be disturbed for at least two hours; at the end of this time she will have recovered somewhat from the fatigues of the labor, and, perhaps, been refreshed by sleep; then she should be carefully placed in her bed, without being permitted to make the slightest effort herself. Let two assistants remove her, being cautious to keep her in the horizontal position.

Toddies and Caudle.—It is the custom with certain practitioners, almost immediately after the birth of the child, to have recourse to some stimulating drink for the patient, under the belief

that it is absolutely necessary. Toddies and caudle are the favorite beverages. In my opinion, they are not, as a general principle, at all needed, and they oftentimes do harm. A cup of tea, or some warm gruel, tapioca, or arrow-root, are far more in keeping with the condition of the patient; and, unless there should be something to indicate the use of wine, etc., I should advise you not to have recourse to it. The thing a newly delivered woman is most in need of, and which will prove an effectual restorative, is repose; and, therefore, she should be scrupulously guarded against intruders at the time, and the chamber kept as quiet as may be consistent with circumstances.

Washing and Dressing the Child.—Now let us turn our attention, for a moment, to the infant. You will recollect, when separated from its parent by the section of the umbilical cord, it was wrapped in flannel, and placed, for the time being, in a spot of safety. The first want of the little stranger is a thorough washing. The nurse should provide a vase of warm water, some Castile soap, and a piece of delicate sponge, or soft flannel. She should then seat herself in a low chair, and commence the work of ablution. The surface of the new-born infant's body is usually covered more or less with an unctuous or sebaceous material, and in order to have this properly removed, it will be necessary, before using the soap and water, to direct the nurse to rub the entire surface gently with fresh sweet oil, or, what answers a very good purpose, the yolk of an uncooked egg. As soon as this is done, the soap and water should be well applied by means of the sponge or flannel; but be careful that the nurse, in her ambition to perform her duty well, does not, as sometimes will be the case, exceed the limits of propriety, by allowing the soap to come in contact with the eyes of the infant. This is a fruitful source of that annoying, and often dangerous affection, *purulent ophthalmia*. When the ablution has been properly attended to, the child should be carefully dried with a warm and soft linen.

The next object is the dressing of the cord, which is done as follows, and which should not be left to the nurse, but attended to by the practitioner. Take a piece of linen three inches square, double it, and cut a hole in the centre, through which the cord is to be drawn. The cord is then enveloped in the linen, turned upward and to the left on the abdomen. A circular band is applied, which will retain the dressing in place, and also afford comfortable support to the child. Be careful that the bandage is not too tight. The common practice with nurses is to use pins for the purpose of attaching the infant's dress. I much prefer the needle and thread, for the pins are apt to become loose, prick the child, and may thus give rise to serious consequences, evoking convulsions, or other troubles.

Is the Infant deformed?—After the circular band has been adjusted, an examination should be made to ascertain whether there is any deformity, such as occlusion of the anus or urethra—whether there exists any malformation of the mouth, which may prevent the child taking the breast. It is proper that these deformities, should any of them be present, be recognized at this time, in order that prompt measures may be adopted to remedy them, and not delay until the infant's life is placed in peril, and too often without the cause of the danger being even suspected. Having become assured of the existence or absence of these deformities, the child is then to be dressed, which may be done by the nurse, without much supervision. The child, its toilet being completed, may in a short time be placed by the side of its mother, if she be awake; to gaze upon it will cheer her heart, and prove a rich compensation for the sufferings she has encountered in bringing it into the world.

After-pains.—So far, then, we have succeeded in making the patient comfortable; the washing and dressing of the child have also been accomplished. The practitioner has not yet left the chamber, nor should he do so until these matters have been attended to. Soon after the placenta has been removed, the patient will complain of more or less pain, closely simulating the throes of labor; and she will sometimes become alarmed, imagining she is about to give birth to another child. These pains are what are known as *after-pains*; they are nothing more than the contractions of the uterus ridding itself of the fluids contained within it, and at the same time, through these contractions, gradually returning, as far as may be, to its pristine state. After-pains, therefore, in lieu of being regarded as morbid or pathological, are to be classed among the usual and necessary phenomena of childbirth. In a woman with her first child—a primipara—these pains are ordinarily slight; in a multipara, on the contrary, they are oftentimes severe and harassing. The reason of the difference is that, in the former case, the uterus is invested with vigor and tonicity, and consequently soon becomes restored to its original condition; while, in the latter, its walls are flaccid, and the contractions, therefore, more protracted.

Before leaving the patient, it will occasionally, from the severity of these pains, become necessary to give something to break their intensity. But, unless they prove so annoying as to occasion much disquietude and prevent sleep, I would advise you not to interfere by medication with this natural process. In administering medicines under any circumstances, be careful, as far as you can do so, to ascertain whether or not the patient is affected with any striking idiosyncrasy; I mean by this whether she is morbidly sensitive to certain remedial agents. You have no right, gentlemen, to assume

any thing touching the peculiarities of those, who may seek your professional counsel. For example, let us suppose that, without observing the precaution to which I have just alluded, you should order for your patient, in case of after-pains, ten grains of Dover's powder. Well, the prescription is filled, and the medicine taken. In a very short time afterward you are sent for, and you find the patient delirious, absolutely crazy. When she returns to her senses, the first thing she will say to you will be something like this: "Oh! doctor, why did you not tell me you had ordered Dover's powder? I took it once and it nearly killed me!" Therefore, always inquire whether such peculiarity of system exists, regarding any remedy which you may propose to administer, and should there be an idiosyncrasy, substitute in its stead something else. If, in your judgment, it become necessary to order an anodyne* preparation, any of the following may be given with the reservation just mentioned:

℞. Syrup. papav. f. ʒ iv.
Mucil. Acaciæ f. ʒ ij.
Sol. Sulphat. Morphicæ (Magendie) gtt. xij.

A tablespoonful every half hour, until the suffering is mitigated. The above is a favorite prescription with me.

℞. Misturæ Camphoræ f. ʒ ij.
Syrup. Simp. f. ʒ j.
Tinct. Opii f. ʒ j.

The half of the mixture, and if not relieved in an hour, give the remaining portion.

℞. Pulv. Doveri, ʒi.
Divide in chartulas ij.

One powder in some sirup, and, if necessary, the second in an hour or two. Or, from ten to fifteen drops of the solution of morphia may be given in a dessert-spoonful of cold water.

Directions to the Nurse.—So much for the patient as to contingent remedies; but, before making his adieu after the birth of the child, there are some other directions not to be neglected by the practitioner. The nurse must be strictly enjoined not to allow the patient, if she desire to pass her water or evacuate her bowels, to sit on the chamber. A bed-pan must be used. This will be somewhat inconvenient at first, but any annoyance in this way will be amply repaid by an immunity from those troubles so apt to

* I have repeatedly met with cases in which the after-pains were characterized by more than ordinary intensity, and traceable to the presence of a coagulium in the uterus. If, as sometimes will be the case, the clot be felt by the finger carried to the
should be immediately removed. Should the coagulium be out of reach,
injection into the bowel will oftentimes aid in its expulsion, after which
may be administered.

follow too early sitting up after delivery, such as prolapsus uteri, procidentia of the organ, or prolapsus of the vagina.

Physicking and Cramming the New-born Infant.—The absurd and mischievous practice obtains, too generally, of giving the little infant oil or some other medicine almost simultaneously with its birth, and of filling its delicate and much-abused stomach—a stomach whose powers of assimilation are extremely feeble—with food of domestic manufacture; and hence the “pap bowl” is a fixture of the lying-in room. This practice, which is one of the products of remote but regular tradition, is fruitful in bad consequences, oftentimes proving the starting-point of disease and death. Why, gentlemen, is it not strange that, with all our boasted intelligence, we should be so inferior to the brute creation in the management of the young? Do you see the slut, with nothing but instinct to guide her, guilty of these absurd practices? Here, there is no medicine given, no pap forced down the throats of her innocent little offspring. The pups as soon as they come into the world, seek each one the teat of its parent, and from these teats they extract both medicine and nutriment. They grow and become developed; they are healthy, and rarely do they need the services of the physician, for the reason that they observe the ordinances of nature. Learn, then, a lesson from analogy, and remember that the identical necessity exists in the infant of the human being to observe faithfully these same ordinances. My rule, therefore, is, as a general principle, to give the new-born child nothing, for the reason that it needs nothing but the material which nature has so carefully and elaborately prepared for it; and that material is the mother’s milk.

When should the Infant be put to the breast?—Instead of administering medicines, and cramming its stomach with food it cannot digest, if nothing should contra-indicate it, have the child put to the breast as soon as the mother has recovered somewhat from the fatigues of the labor, say in two or three hours. But you may urge as an objection to this practice, that there is very little milk at this early period in the breast. Well, admit, for argument sake, the fact; still this early application of the child is one of the efficient promoters of the milk secretion; the tractions made upon the nipple invite the milk to the breasts, and the child at this early period extracts what is known as the *colostrum*, an element possessing purgative qualities, and which readily and efficiently removes from the intestinal canal the meconium—a black viscid material found in greater or less quantity in the bowels of the new-born infant, and which appears to consist of a mixture of bile and products secreted by the intestinal mucous surface. Let me here enjoin upon you the necessity of cautioning the mother against having her infant in bed with her while she sleeps. It is stated on the author-

ity of Oslander, that in England, between the years 1686 and 1799, 40,000 children were destroyed by being overlaid by their parents.

A Sunken or Flat Nipple—How Remedied.—One more direction before taking leave of your patient, and a very essential one it is, too—let the nurse examine the breasts, and tell you whether or not the nipple is well formed. It sometimes happens that it is quite sunken and flat, so much so that it will be impossible for the child to grasp it in its mouth: the consequence will be that the mother is fretted and fatigued by the negative efforts of the infant, and this latter will be defrauded of what it has a birthright claim to—its natural nourishment. In order to overcome the difficulty take an ordinary pint bottle with a long neck, fill it with hot water, then pour out the water, and apply the mouth of the bottle immediately over the nipple; as the bottle cools there is a tendency to a vacuum, and thus a powerful but equable suction is produced, which results in elongating the nipple. The bottle is then removed, and the child applied.

The First Visit after Delivery.—These various matters having received attention, you bid good-day, or good-night, as the case may be. Whenever you can do so, it should be your general practice not to allow more than twelve hours to intervene, from the time of delivery, before you pay your next visit. During this visit, you will learn how things have progressed since you left. Has the patient had a comfortable sleep? Has she been much annoyed by the after-pains? Has she passed her water? How is her pulse? Is it right, or is it accelerated and bounding, indicative of inflammatory action, and if so, where is the inflammation? Is the quickened pulse merely the result of your presence, and, therefore, transitory? Is there pain in any portion of the abdomen? If so, is it constant, or is it recurrent? If constant, is it the result of inflammation, or of intestinal flatus, or of a distended bladder? Is there any febrile excitement? This is a running schedule of the questions, which will suggest themselves to the mind of an intelligent and vigilant physician, anxious to be prepared in time in the event of danger, and equally anxious to know that every thing is progressing as he would desire.

The nurse may tell you that the lady has suffered a great deal of pain in her bowels; and will also, perhaps, inform you that the slightest pressure aggravates the distress; the nurse at the same time giving to her agreeable countenance a sort of doleful expression, wishing you to understand that she by no means likes the appearance of matters. Now, under these circumstances, what are you to do? Are you suddenly, and without cause, to become a convert to the misgivings of the nurse, and alarm your patient by sad omens and a long face; or, as a conscientious physician, will you not at once subject every thing connected with your patient to

a searching analysis, and ascertain in this way what really is the matter—whether there is a substantial something, or whether the apprehension of the nurse is a mere phantom.

What, then, is the pain in the bowels? It may arise from the contractions of the uterus, and, therefore, it is simply due to the after-pains; it may arise from distended bladder, or from a flatulent condition of the intestinal canal, or from a collection of fæcal matter in the lower bowel making undue pressure on the uterus, or from inflammation either of the uterus itself, or the peritoneum.

Diagnosis.—In “after-pains” the distress is not constant, but paroxysmal or recurrent, and there is between the paroxysms an interval of decided calm. The pulse is usually not disturbed, nor is there febrile excitement. If the difficulty be caused by distension of the bladder, the organ will be found enlarged, stretching over the hypogastric region, and imparting to the hand a sense of hardness. *In addition, you will have learned from the nurse that madam has not passed her water since the birth of her child.* Sometimes, and I have seen such cases, when the retention of urine is complete, so that none whatever escapes from the bladder, and this state of things has continued for two or three days, the abdomen becomes enormously distended, presenting the aspect of ascites; in these aggravated instances the pulse will run high, 120 in the minute; and there will also be coma, more or less profound, from the accumulation in the blood of the urea, which should have been excreted from the system through the urinary apparatus, constituting a case of blood-poisoning—uræmic intoxication. If it be a case of flatus in the intestinal canal, there will be the sound of resonance under percussion, together with distension of the abdomen, and an occasional eructation of gas through the œsophagus, or a passage of it per rectum. There will also be an alternation of increase and diminution in the size of the abdomen, depending upon the quantity of flatus, which may find exit. The pulse will generally be undisturbed.

If the lower bowel be distended with fæces, you will have good reason to suspect that this is so, if the patient informs you that she has been more or less constipated during the latter period of her pregnancy. Lastly, if there really be inflammation, the whole system at once becomes involved; the pulse is rapid, 120 to 130 beats in the minute; febrile excitement, excessive tenderness on pressure, pain constant, pallor and anxiety of countenance, with a general arrest of the secretions. Thus, gentlemen, you proceed with your analysis, and, having discovered the truth, you will then know what to do.

Retention of Urine.—This is not a very unusual attendant upon the delivery of the child, and calls for the proper attention of the accoucheur. I desire to remind you, for the moment, that there is

a very important distinction between *retention* and *suppression* of urine. The former implies that condition in which the urine is secreted by the kidneys, and passes through the ureters into the bladder, and there becomes retained, accumulating, and thus producing inordinate distension of the viscus. In suppression, on the contrary, it is not the bladder, but the kidneys, which are at fault, there being little or no urine secreted. With this distinction before you, what would you think of the practitioner, who, being called to a case of retention, should administer diuretics; and yet, gentlemen, this has been done, and the vicious practice will continue until physicians are brought to think and analyse. Routine practice is one thing; but the tracing of effects to causes, and the application of appropriate remedies to those causes, indicate the scientific practitioner. A very common cause of retention of urine after childbirth, is paralysis of the bladder above the sphincter, thus disqualifying the organ from contracting sufficiently to expel its contents; while, on the other hand, paralysis of the sphincter itself gives rise to an opposite condition—incontinence of urine. The paralysis in either case is usually not of long duration; and will generally pass off in a few days.

The object, in retention, is to unload the bladder; and this may be done sometimes by the application of hot cloths to the vulva and hypogastrium. I somewhere read years ago of the practice in these cases of pouring, within the hearing of the patient, water from a vessel slowly into a pitcher; and I can vouch for its efficacy in several cases in which I have had recourse to it. Should, however, this expedient, and the warm fomentations fail, then we have a certain remedy in the catheter. It is a curious, but interesting circumstance that, occasionally, after the patient has made vain attempts to relieve herself, and after the failure of the ordinary remedies, the moment the accoucheur suggests the necessity of having recourse to an instrument for the purpose of drawing off the water, madam, alarmed at the idea of an instrument, tells the nurse in an undertone,—“Oh, I think I can relieve myself now;” the nurse brings the bed-pan, and sure enough the bladder is evacuated. This is a striking illustration of the operation of mind upon matter; and I have witnessed its happy effects in more than one instance.

Mode of Introducing the Catheter.—This, like many other operations, is very simple, if you know how to perform it; but simple as it is, it very often happens that the practitioner fails in his attempt from ignorance or carelessness, and such failure is not without sad consequences to his reputation. The first point in the operation is to find the *meatus urinarius*, or outer opening of the urethra, and this should be accomplished without in any way exposing the person of the patient. If I can have my choice, I prefer

the patient on her back, lying near the edge of the bed, with her thighs slightly separated, and flexed upon the pelvis. The index finger of one hand, lubricated with oil, is then directed to the vagina. The rules for recognizing the meatus may be classed as follows: 1. Let the radial surface of the index finger be carried up to the anterior portion of the vagina; here it is brought in contact with the lower wall of the urethra; then, taking the urethra as a guide, draw the apex of the finger along this wall in a forward direction; this necessarily brings you to the outer extremity, or *meatus*; 2. Place the apex of the index finger at the superior commissure; here will be found the clitoris, and, in drawing the finger perpendicularly downward along the vestibulum, the *meatus* will be reached just at the base of this triangular space; 3. Place the end of the finger on the summit of the pubic arch; very near, and a little below this point, you will, by gently moving the finger about, come directly in contact with the orifice of the urethra. If either of these rules be properly observed, there will, unless in case of some deformity of the parts, be no difficulty in easily recognizing the meatus urinarius.

The water-passage in the female, as was mentioned when describing the external organs, is remarkable for its shortness and great dilatability; and its direction is slightly oblique from below upward. Having found the meatus, keep the point of the index finger upon it to serve as a guide for the introduction of the catheter. This instrument is constructed of various materials, silver, pewter, or caoutchouc. I prefer one of silver; it should be at least six inches in length, and slightly curved. Before introducing it, let it be well lubricated with oil, and this is better than lard or butter, for either of these latter may close up the little openings on the side of the terminal extremity of the catheter, and thus prove an obstacle to the free passage of the urine. As soon as the instrument is within the meatus, I would advise you immediately to glide the finger, which has been passed as a guide, within the vagina, keeping it on the lower wall of the urethra, which will enable you not only to feel the catheter through the wall, but also to prevent laceration of the part. One point always bear in mind, in the introduction of the instrument—*never attempt to substitute brute force for skill*; and when you recognize an obstacle to its free passage, you may depend that something is wrong, and that wrong is not to be remedied by physical force. If the secrets of the lying-in room could be unmantled, and the drapery of concealment removed, among other melancholy disclosures we should have many a tale of sorrow touching lacerations of the urethra, bladder, and vagina, from the clumsy and unpardonable employment of the catheter.

The instrument, then, being within the urethra, a very gentle movement is to be imparted to it obliquely from below upward.

The catheter having reached the bladder, the stiletto is withdrawn, and, as a general thing, there will be a copious flow of urine, but where will the urine fall? Why, on the bed, without a question, occasioning a very agreeable and interesting condition of things, if you should have neglected an essential point in the operation—bidding the nurse to have in readiness a bowl in which the urine is to be received as it passes through the catheter. It should be a small bowl, placed between the thighs of the patient; as soon as it is filled, let the contents be emptied into a vase, which should be at hand, being careful while emptying it to place the finger on the mouth of the catheter to check, for the moment, the running stream. It may sometimes occur that, after the catheter is introduced, no urine flows; this is an embarrassing state of things, and may arise from various causes: 1. Although you may imagine the catheter to be in the bladder, yet it is not there, but simply in the vagina; 2. The holes at the end of the catheter, or the body of the instrument itself, may be obstructed by flocculent matter or mucus floating in the urine; 3. The instrument may not be sufficiently far introduced, having passed merely to the neck of the organ.

Obstacles to the Ingress of the Catheter.—There may exist certain obstacles to the free ingress of the catheter into the bladder; for example, the various malpositions of the uterus.* In prolapsus, the organ may make such pressure against the neck of the bladder as completely to prevent the passage of the instrument; the remedy is very simple—introduce the finger into the vagina, gently elevate the prolapsed uterus, and then with the other hand pass the catheter. The fundus of the womb may be in a state of ante-version, the fundus resting upon the bladder; this also is to be remedied by pushing the fundus backward, thus liberating the bladder from the pressure; or the uterus may be retroverted, the fundus having fallen backward; in this case, the cervix of the organ will be thrown forward, and, as a consequence, more or less pressure exercised against the neck of the bladder. In order that the catheter may pass under these circumstances, it will be necessary to relieve the bladder from the pressure by pushing the cervix of the womb backward toward the centre of the pelvic excavation. In procidentia of the uterus, the organ has fallen beyond the vagina, and is situated between the thighs of the patient; when this malposition of the organ occurs, the bladder will, of course, be brought down more or less with the uterus, and, in consequence of this latter circumstance, the direction of the *meatus urinarius* will be so changed, that it will look more or less upward; if this fact be not recollected, the practitioner will be foiled in his effort to intro-

* It is possible that some of these malpositions may be coincident with a recent delivery, and, therefore, I mention them in this connexion.

duce the instrument. An attempt should always be made to reduce the procidentia, and return the organ within the vagina; it should then be retained in situ, enjoining upon the patient the absolute necessity of the recumbent position, with the hips slightly elevated.

Incontinence of Urine.—After a protracted labor, it is not unusual for the patient to be unable to hold her water, as the phrase goes; and this is almost always dependent upon the severe pressure, which has been exercised by the head or presenting portion of the child upon the neck of the bladder, producing a paralysis of the sphincter, and thus incapacitating it from retaining the urinary secretion. Ten drops of the tincture of cantharides in a wine-glass of flax-seed tea twice a day, will prove a good remedy in these cases; or the application of a small blister to the upper portion of the sacral region will answer equally well. I need not remind you that the *modus operandi* of this treatment is readily explained—the cantharides, whether administered internally, or through its absorbent action, when applied as a blister, has oftentimes a specific effect on the neck of the bladder, producing what is known as strangury, and in this way it becomes an important therapeutic agent, when it is desirable to stimulate, through nervous influence, the muscular fibres of the sphincter vesicæ.

Here, it is right to tell you that it is possible you may form an erroneous opinion with regard to the *incontinence of urine*. For instance, the nurse may inform you that madam cannot hold her water; well, this may be the case, but there are other conditions besides paralysis of the neck of the bladder, which will occasion this difficulty. A vesico-vaginal, or urethro-vaginal fistula, constituting rents between the vagina and bladder, or the urethra and vagina, may be the cause of this constant dribbling away of the urine; under these latter circumstances, it would amount to nothing short of stupendous folly to hope, through the action of cantharides, to remove the difficulty. Therefore, gentlemen, be careful in your diagnosis.

Flatus in the Intestinal Canal.—Women, soon after delivery, will occasionally suffer great distress from an accumulation of flatus in the bowels; and I think I have observed this more particularly after severe floodings. This distended condition of the canal has sometimes been mistaken for inflammation, and it is very important that you should understand the distinction. In tympanites, slight pressure will produce pain, but increased and long-continued pressure will afford relief; should there be inflammation—and this is frequently accompanied by a flatulent distension of the intestines—the greater the pressure the more marked and severe will be the pain; besides, the various phenomena indicative of inflammatory action will be present. Great benefit will be derived in cases of

flatulence, from a combination of turpentine and castor oil; half an ounce of each may be given by the mouth; or the following draught may be ordered:

Olei Terebinth., f. $\frac{3}{4}$ ss.

Mucil. Acaciæ, f. $\frac{3}{4}$ iss.

Tinc. Opii f. 3 ss.

M.

In these cases, too, relief will be derived by the application to the abdomen of a warm flannel sprinkled with turpentine.

A Loaded Condition of the Lower Bowel.—This is another not unfrequent cause of distress to the recently delivered woman, and will be apt to lead the practitioner astray, unless he exercise due vigilance in his diagnosis. Most women neglect their bowels under almost all circumstances, and this very neglect proves a severe tax on their health; but more particularly are they careless in the latter months of gestation, and hence, soon after the birth of their child, they oftentimes suffer great pain from an accumulation of fecal matter in the colon and rectum. When this state of things is ascertained to exist, immediate recourse should be had to an enema, which will bring away the mass of excrement, and thus give present comfort to the patient, and, perhaps, save her from serious subsequent trouble. A good injection for this purpose will be the following: A pint and a half of soap-suds, one ounce of castor oil, four large spoonfuls of molasses, with one of table salt. This will form a capital enema for the occasion. You will, I am sure, excuse me while upon this subject, in calling your attention to a simple, but in reality a very important point, and it is this—you direct the nurse to administer the enema as above prepared, she does so—at least she thinks she does—but instead of throwing the contents of the syringe into the bowel, it will oftentimes happen that they lodge in the bed, and for the reason that the pipe of the instrument has merely been placed in the vicinity of the anus, instead of being properly introduced. Therefore, when this practice becomes necessary, unless you have an intelligent and reliable nurse, who understands and appreciates the difference between right and wrong, *perform the operation yourselves*. If the remedy be indicated, it is as much your duty to see that it is properly administered, as it would be in applying a ligature for aneurism to be sure that you had embraced within the ligature the artery instead of the nerve.

There is, however, another form of constipation, which you will sometimes meet with in the puerperal woman, well worthy of attention. It will resist the administration of cathartics by the mouth, and will be equally beyond the control of enemata. It is constipation traceable to paralysis of the rectum—the nerves regulating the functions of this portion of the intestinal canal having, in consequence

of a protracted and severe labor, undergone a degree of pressure, which deprives them of the ability to control muscular action. There is an interesting case of this kind reported by M. Martin, of Lyons, in which the fecal matter was retained for a period of more than twenty days. He was compelled to introduce into the rectum a scoop, and thus bring away the masses of hardened feces; and it was not until the lapse of twenty-nine days that the intestine recovered its tonicity.*

The Lochial Discharge.—One of the ordinary accompaniments of the puerperal woman is a discharge from the uterus, which continues for several days, and sometimes weeks,† after childbirth, and is known as the lochia; it is nothing more than the oozing from the mouths of the utero-placental vessels, together with the passing off of the decidua, while the uterus is returning to its original condition.‡ At first, the discharge is sanguineous, and it may assume this character for two or more days after delivery; then the color is changed, partaking more or less of a serous nature, and presents a greenish hue; it then becomes whitish, and ultimately ceases altogether. After the first day or two, there is a sort of *sui generis* smell, and which I have remarked striking, or, in other words, more offensive in women of dark complexion, hair, and eyes—the brunette.

The lochial discharge will sometimes need attention; and you should be careful, in the first visit to your patient after delivery, to inquire of the nurse whether or not the discharge be right. The nurse may tell you, to use her own expression, that “it is very scant,” or that there is none at all. This state of things will be apt to give rise to disturbance, especially in plethoric women, and in

* It will occasionally happen that, after a labor of protracted duration, and more especially when the perineum has been subjected to long-continued distension, the muscles of this part will become partially paralyzed—giving rise to great difficulty in defecation, from embarrassment in voluntary movement; and this condition of things may continue for months, and in some instances for life. I have, in two cases of this kind, experienced the best effects from the internal administration of minute doses of strychnine. This being an example of reflex paralysis, and, consequently, not traceable to congestion or injury of the spinal cord, the strychnine constitutes a valuable remedy.

† Galen taught the curious doctrine that the fœtus appropriates to itself the best part of the blood for its own nourishment, and leaves the rest; and this is the reason why pregnant women are troubled with bad humors, which are thrown off after delivery. The following is his language: “Fœtum in se meliorem, qua nutriatur, sanguinis portionem trahere, deteriorem relinquere; quæ causa est prægnantibus cacochymicæ, quam natura post-partum evacuat.” This post-partum evacuation he describes as the lochia.

‡ Hippocrates held that when the infant is a female, the lochia usually continues forty-two days; if a male, thirty days. Nam et purgatio a partu fit mulieribus ut plurimum, in puella quidam concepta, duobus et quadraginta diebus. In masculo vero purgatio diebus triginta contingit. 2. De natur puer, cap. 5. Vol. V., p. 314. It is needless to remark that this is simply an opinion without anything substantial for its basis.

women of more than ordinary nervous susceptibility. In the former, occasioning fever, flushed countenance, headache, a bounding pulse, all of which, if permitted to pass unchecked, not only portend, but will actually result in mischief. In the latter, there will be restlessness, jactitation, and sometimes even convulsive movements. Again: the lochial evacuation will occasionally be too profuse, prostrating the patient, and, in this way, laying the foundation of future trouble. You see, therefore, gentlemen, how important it is to have an eye to the lochia. When it is scant or entirely suppressed, I have found much benefit from a warm flax-seed poultice, put into a flannel bag, with which should be incorporated 3 ii. of powdered camphor. The poultice thus prepared to be laid over the vulva, and repeated every hour or two, if necessary. When, on the contrary, the discharge is too profuse, a teaspoonful of the tincture of ergot in a wine-glass of cold water twice a day will generally be followed by good effects. When what is called the milk fever comes on, which is about the second or third day after delivery, the discharge usually ceases for a few hours, but returns as soon as the fever passes off. The nurse should be directed to have the vagina properly cleansed by injections of tepid water two or three times a day.

Attentions to the Infant.—We are not to forget the little infant in this first visit; and, therefore, let us devote a few moments to its welfare. Has it been put to the breast, as you directed? Have its bowels been moved, and has it passed its water? The nurse will, perhaps, say that everything is perfectly right—it has taken the breast freely, it has had several dark-colored evacuations—the meconium—and it has passed its water. Well, all this is as it should be, and of course renders the exercise of your skill unnecessary. On the other hand, the child may have been put to the breast; but, in consequence of there being no milk, it has had no nourishment; and as it has not been able to extract from the breast the colostrum, its natural and efficient cathartic, it has not been purged; it may also be that it has not passed its water. Here, then, is a state of things which calls for prompt action. The first matter to be attended to is, to give the infant a teaspoonful of olive oil, or a little brown sugar dissolved in water, or equal parts of molasses and water. Either of these will generally suffice to produce a cathartic effect. You must remember that if the meconium be allowed to remain in the intestines, bad consequences may ensue; and I am quite confident that convulsions in the new-born infant are often the result of this neglect. The meconium becomes an irritant, and in this way is the cause of eccentric nervous disturbance. You cannot too faithfully recollect this fact.

Feeding the Infant.—The child, until it is enabled to obtain nourishment from its mother's breast, may be fed with diluted cow's milk. This is a near approach to human milk. Should it

become necessary, from the indisposition of the parent, or other circumstances, to bring the child up by the bottle, as it is termed, it will be found useful to restrict it exclusively to this form of diet for at least two months.* Its powers of assimilation are extremely frail, and it needs, for the first six or eight weeks after birth, the blandest possible nourishment. After this period, it may partake of farinaceous articles, such as oatmeal with milk. There is one caution especially important for the first four or five months—the food should be thin and taken through a teat. This will prevent that stereotyped evil—stuffing the young infant. Be careful, also,

* In the American Journal of Medical Sciences for July, 1858, Dr. Cummings has given us an interesting and practical paper "*on Natural and Artificial Lactation*," from which I make the following extract:

Cow's milk contains,		While human milk contains	
Butter	38.59	Butter	20.76
Casein	40.75	Casein	14.34
Sugar	53.97	Sugar	75.02
Water	866.69—	Water	889.88

* Cow's milk, therefore, contains nearly three times as much casein as human milk, but less than twice as much butter. In cow's milk, the butter is to the casein as 100 to 105; in human milk as 100 to 70. If then, by dilution, we reduce the butter to 20.76, we shall have 21.92 of casein, or 50 per cent. more than in human milk. With such an excess of casein we cannot hope to succeed. If, by a further dilution, we reduce the casein to 14.34, we have only 13.58 of butter, or less than two-thirds of the proper proportion. Such milk may, for a season, seem to suit the child, but before long it will be found that it does not thrive. The reason is plain. The right proportion of butter is 20.76; this warms a child, and supplies nervous energy. But, by withholding one-third, you lower the temperature of the body, and deprive the nervous system of one-third of the special nerve-food, the indispensable *lecithin*. In a short time pallor and languor supervene, and health evidently declines, &c., &c. It is thus evident, that by no mode of dilution can ordinary cow's milk be made a substitute for human. There will be, in every case, an excess of casein, or a deficiency of butter. So long as the butter is to the casein as 100 to 105, instead of as 100 to 70, so long must dilution fail to adapt it to the wants of the child. But if this original proportion could be changed to that existing in human milk, we might have hope of success. And we proceed to show how this may be done. If we leave at rest for four or five hours ordinary cow's milk, and then remove and examine the upper third, we find in it 50 per cent. more butter than it at first contained. In round numbers, its butter is no longer to its casein as 100 to 105, but as 150 to 105, or as 100 to 70. If then, by dilution of this milk, we reduce the butter to 20.76, we have 14.34 of casein, as in human milk. By using the latter half of the milk furnished by the cow, we have 54 of butter, to 88 of casein, the right proportion exists, and by proper dilution, it may be made to resemble, in its chemical constitution, human milk."

	Milk.	Water.	Sugar.
For a child from 3 to 10 days old, . . .	1000	2643	243
For a child 1 month old, . . .	1000	2250	204
For a child 2 months old, . . .	1000	1850	172
For a child 5 months old, . . .	1000	1000	104
For a child 6 months old, . . .	1000	875	94
For a child 11 months old, . . .	1000	625	73
For a child 18 months old, . . .	1000	500	63

that the nurse does not fall into the absurd error of supposing that every time the child cries, it is hungry, and, therefore, must be fed. If we could have the correct statistics upon this question, the converse of the popular belief would be found to be true, viz. that the child far more frequently cries from being overfed, than from the want of adequate nourishment.*

The Infant has not Passed its Water.—The little stranger has not passed its water—at least, so says the nurse. I have often been told this, and quite often, too, found that the nurse, without intending to deceive, was altogether mistaken. In these alleged cases of non-micturition, I am in the habit of examining the child's diaper, and generally I have discovered the evidences of a free stream. Would it not be cruel, to say nothing of the danger, to subject the infant to medication for this supposed trouble, when, in fact, it did not exist?

It will occasionally be the case, however, that micturition has not been accomplished; and the first point to be ascertained is, what is the cause of the difficulty. The infant, like the adult, may fail to pass its water because of suppression or retention of the urinary secretion; and, therefore, before prescribing, the intelligent practitioner will be careful to ascertain to which of these conditions the trouble is due.

Suppression and Retention of Urine in the Infant.—Suppression is, I think, very rare in the new-born infant; for, as the kidneys are organized at comparatively an early period of embryonic existence, their function is also early developed. Retention, on the contrary, is of more frequent occurrence, and may arise from various circumstances, such as congenital malformation, a collection of mucus in the urethra, spasmodic contraction of the neck of the bladder, etc. In retention, there is a circumscribed hard tumor in the hypogastrium; while, in suppression, there is no such tumor, for the reason that as there is an absence of the urinary secretion there is consequently no distension of the bladder. Occasionally, in retention of urine in the new-born infant, the bladder becomes enormously distended; and, in this affection, death may ensue from rupture of the organ or ureters, inflammation of the peritoneum and abdominal viscera, or coma.

In suppression, a few drops of sweet spirits of nitre in a little sweetened water, may be given; or, what will be found a good remedy, will be parsley tea, to which the nitre may be added. In retention, the treatment will, of course, depend on the particular cause which produces it. If the urethra be obstructed by the presence of mucus, the introduction of a small bougie will suffice to

* When the infant shows evidence of weakness, or indicates a scrofulous condition, benefit will be derived from mingling with its food a small piece of butter, or mutton suet.

remove it; if, as is sometimes the case, the obstruction be occasioned by a membranous band, incision of this latter will be the remedy; should it be that there is a spasmodic stricture of the neck of the bladder, the warm bath and the bougie will be indicated.

Milk in the Breasts of the New-born Infant.—There is a circumstance connected with the new-born infant well worthy of attention. I allude to the presence of milk in its breasts; for, without being cognizant of the fact that this secretion does really exhibit itself, you would very likely be embarrassed if consulted upon the subject. It in no way involves either the comfort or health of the infant, and the secretion ordinarily ceases at the end of the first month. I have repeatedly met with such cases; and all I recommend is to protect the breasts against the pressure of the dress, and, if necessary, to lubricate them two or three times a day with olive oil. An interesting paper has recently appeared from the pen of M. Gubler, entitled* “*La Sécrétion et la Composition du Lait chez les Enfants nouveau-nés des deux Sexes.*” M. Gubler founds his memoir on observations made on 1200 new-born children. The secretion is very rarely observed in notable quantity, and only exhibits itself as a serous fluid for the first two or three days of extra-uterine life. On the fourth day the glands are larger, and there frequently escapes under pressure a dense and opaque fluid. The number of infants in which the secretion exists, as also the quantity of the fluid itself, gradually increase until the eighth day, when it seems to attain its maximum. From the ninth to the tenth day, in sixty-five children, there was one in which the secretion was not observed. The increase in the volume of the breasts and the secretion usually continue, to a certain degree, until the twentieth day. One hundred and forty-nine out of one hundred and sixty-five infants, from twelve to twenty-one days old, exhibited the secretion in variable quantity. At the end of a month, it is extremely rare for the secretion not to have ceased altogether. In four instances, however, M. Gubler observed it to continue for two months. The milk of the new-born infant, according to this writer, assisted by the able chemist, M. Quérenne, is more alkaline than the milk of the adult woman and of animals. It would seem that there is a striking identity between the milk of the infant and the ass. The following is the analysis of M. Quérenne:

	Milk of Woman.	Infant.	Ass.
Butter,	2.60	1.40	1.40
Casein,	3.90	2.80	1.70
Sugar, and extractive matter, . .	4.90	6.40	6.40
Water,	88.60	89.40	90.50

* For an analysis of this memoir, see “Appreciation des Progres de la Physiologie,” by E. Brown-Séquard, *Journal de la Physiologie*, vol. ii., p. 410.

It is proved by this analysis that the liquid secreted in the breasts of the infant is really milk. It, therefore, is to be regarded a demonstrated fact, from the combined observations of M. N. Guillet, Dr. Battersley, of Dublin, and M. Gubler, and more especially from the analysis of M. Quérenne, that the secretion of milk in the breasts of the new-born infant is a physiological act of very general occurrence.

Milk Fever.—From twenty-four to forty-eight hours after delivery, the patient may experience a chill, followed by more or less febrile excitement, with headache and suppression of the lochia. These phenomena sometimes accompany distension of the mammae by the milk, hence they are classed under the term—*milk fever*; they need give you very little concern; they are among the occasional sequents of childbirth, and pass off in the course of a few hours. Be careful, therefore, not to lose your equilibrium, and imagine that the chill, fever, etc., are the sure harbingers of peritonitis, metritis, or some other serious malady. There is no pain in the abdomen on pressure, and although the pulse may be quick for the time being, it is not the pulse of inflammation; nor is there that anxiety of countenance so characteristic of serious puerperal inflammation. Much benefit will be derived, should there be excitement, from a gentle diaphoresis. For this purpose, give every hour or two a tablespoonful of the spirits of Mindererus.

Blot has ascertained a curious and interesting fact—that when the milk begins to distend the breasts, the pulse, instead of being accelerated, frequently diminishes in its beats, being 50, 55, and 60 in the minute.

Cathartic to the Mother.—On the third day after confinement, it will, if the bowels have not previously moved, be necessary to administer some aperient medicine to the mother; and in doing so, it will be proper to inquire whether she has any preference as to what you shall prescribe; for here, as in the example of the anodyne to which we have made allusion, there may be some idiosyncrasy of system; and it will also be prudent to inquire whether she is easily affected by medicine, or the reverse. This will indicate to you the quantity, and the frequency of repetition, which may be necessary. Half an ounce of castor oil, to be repeated in four hours, if necessary; or 3 ss. of magnesia with 3 ij. of epsom salts in half a tumbler of cold water; or,

R Sulphat. Magnesiae 3 ij.
 Infus. Sennae, f. 5 iv.
 Tinct. Jalapae, f. 3 i.
 Mannae, 3 i.

M.

One half to be taken, and repeated in four hours, if needed; or,

the compound rhubarb pill may be ordered. If there should be any indication of hepatic derangement, it will be desirable to give a five-grain blue pill, followed in six hours by one or other of the above prescriptions. You will find stewed prunes a valuable aperient, where there is no indication for more active medicine; they generally agree with the patient, are acceptable to the taste, and are not associated with the drug shop.

Torpor of the Bowels in the Infant.—You will have cases in which there is unusual sluggishness in the system of the infant, and without care in their management, much harm may ensue. Here, for example, you will be between Scylla and Charybdis—for if the infant be permitted to continue in a state of constipation, there will be more or less danger of convulsions; and if, on the other hand, you fill its delicate stomach with physic, you awaken irritation, which may be the starting-point of disease, and finally death. How often have I been consulted in cases of infants a few days old, because of constipated bowels; and it would severely tax your credulity if I were to name the variety of remedies prescribed for these poor little innocents, without subduing the difficulty, but most certainly impairing the health of the sufferers. There are two modes of removing constipation in the nursing child—one is by direct, the other by indirect medication. In the former instance, the medicines are administered to the child itself; in the latter they are given to the mother, with a view of affecting the child through the changes which these remedies produce in the milk of the parent. Now for the point. It very often happens that the constipation of the infant is but a reflex of the condition of its mother; she suffers from torpor of the bowels, and this sluggishness of system is transmitted to the child through the milk. Under such circumstances, it would be absurd to expect any permanent result from medicines given directly to the child. Therefore, permit me to inculcate this important precept—when consulted in a case of constipation in a new-born infant, let your first inquiry be, if it be nursing, as to the state of the mother's bowels. If these be torpid, give no medicine to the infant, but administer appropriate remedies to the mother; make her bowels right, and you will thus, through the modification of the milk, soon find that the system of the child will also become right.

Occlusion of the Anus.—There is another condition of the new-born infant which needs a word or two of comment. Some twelve or fourteen hours after its birth, you will occasionally notice the child to be in great distress—it moans piteously, refuses the breast, and its abdomen is greatly distended; at first it took the breast, but now absolutely rejects it; it will not sleep, and the expression of its countenance is that of positive anguish. The nurse, in reply to your question, will tell you that it has had no passage since its

birth; and she will, perhaps, confess that she has given it oil, or something else, several times within the last two or three hours, but the child has invariably thrown it from the stomach. It has passed its water freely and often. This, then, gentlemen, is the case—what do you make of it? You are sent for to prescribe for this little patient, and the mother is most anxious for the safety of her child; she implores you to administer something to relieve its bowels. Be careful how you rashly attempt to gratify that appeal without having previously satisfied yourselves of the true nature of the difficulty. Does not the aggregate of the circumstances, just named, lead you at once to suspect why the bowels have not been moved? Has it not already occurred to you that the cause may be mechanical obstruction—*occlusion of the anus*? In lieu, therefore, of routine practice, examine the infant carefully, and if your suspicions be confirmed, do the only thing which promises safety to the sufferer—remove the occlusion by an operation. As soon as the mechanical obstruction is overcome, the bowels will be evacuated, and the child relieved.

Congenital occlusion of the anus may present itself in various forms or degrees; for example, the opening may be simply closed by a delicate, fine skin. Sometimes the anal aperture will be well formed for an inch or two, and the obstruction will commence beyond this point; and there are cases in which the rectum may terminate in a blind pouch at any distance from the sigmoid flexure to the anus itself. In the first of these varieties, a simple crucial incision will suffice to remove the difficulty; in the second and third, you may introduce a small trocar, following the course of the sacrum, and thus penetrate the pouch. It may become necessary afterward, for a few days, to employ a small tube with a view of preventing the closure of the aperture.

Purulent Ophthalmia—Ophthalmia Neonatorum.—The infant, two or three days after its birth, will occasionally be affected with inflammation of the eyes; and let me here caution you against the danger of not attending to this species of ophthalmia at its very commencement. A few hours of progress, without proper treatment, will often lead to the destruction of the eye. On the other hand, if promptly treated, it will usually yield without trouble. In this affection, the tunica conjunctiva of the lid is first attacked, soon becoming the seat of active inflammation, resulting in copious purulent secretion; and if the inflammation be not speedily arrested, the cornea is next involved—infiltration of pus between the laminae ensues, forming what is termed *onyx*—the laminae themselves become ulcerated, and the eye is soon destroyed through the progress of the ulceration.

Causes.—Purulent ophthalmia in the new-born infant may arise from various causes: 1. Leucorrhœal matter from the vagina of

the mother at the time of birth; 2. Cold; 3. Exposure of the eye to a sudden and bright light; 4. Soapsuds applied to the eye of the infant during its ablution.

Symptoms.—The symptoms of this affection are easily recognised. At the commencement, one or both eyes appear weak; there is a slight weeping; in a few hours inflammation sets in, and a muco-purulent discharge is observed; the lids become agglutinated and distended by the accumulation of the morbid secretion, the child is restless and feverish, the tongue coated, and the bowels usually torpid.

Treatment.—The mother is naturally much alarmed, and will urge you to tell her whether there is any danger of the child's losing its sight. If the inflammation be confined to the conjunctiva, you can very safely say that it will readily yield to judicious treatment, which should consist principally in local applications; but the applications are not to be confided to the nurse; they should be made by the practitioner himself in the following manner: The child, being on its back, resting in the lap of the nurse, the practitioner, placing its head on his knee, and, with a soft sponge moistened with tepid water, cleanses the eyes; the lids are then gently separated, and, after everting them, the accumulated matter should be removed. The eyes are to be washed several times during the day, with the following collyrium:

℞ Hydrarg. muriat. gr. j.
Sal ammoniac. gr. iv.
Aquæ destillatæ, f. ʒ vi.
Ft. sol.

It may also become necessary to touch the inflamed conjunctiva, by means of a camel's hair pencil, with the following solution, once a day:

℞ Nitrat. argenti, gr. ij.
Aquæ destillat. f. ʒ j.
Ft. sol.

When the child falls asleep, with a view of preventing their agglutination, the outside borders of the lids should be smeared with fresh butter, fresh olive oil, or what perhaps is better, the red precipitate ointment. The bowels are to be kept regular with castor oil, or flake manna in solution; and above all, the eyes to be protected against the light.

This treatment, if faithfully carried out, will effect a cure, and should not be surrendered for leeches, blisters, etc. They are not only rarely indicated, but frequently result in great danger to the infant. Remember that the young child bears the abstraction of blood badly, and the irritation of the cantharides is oftentimes most injurious.

I should not omit to mention here the means employed by Chas-saignac; it consists in having a constant current of water running upon the eyes for several hours consecutively. It is said that it has been followed by much success.

Sore Nipples.—These are a great annoyance to the puerperal woman, and unfortunately too often rebellious to treatment. The outer covering of the nipple, the mucous membrane, is made by the tractions of the child's mouth exquisitely tender, and in a day or two subsequently it cracks and becomes fissured. Sometimes, however, there is simple excoriation; the pain which the mother experiences is most intense; the nursing of her infant is a severe struggle between duty and physical suffering. The true difficulty of relieving the sore nipples is this: no matter what remedy you may apply, every time the child is put to the breast it opens the fissures anew, and in this way what you may accomplish in one hour is undone in the next; and if, on the other hand, the child be not permitted to nurse, the breasts become engorged, inflammation ensues, and mammary abscess is the consequence. In these cases, numerous remedies have been suggested; but I have found nothing answer better when the nipple is fissured than a solution of the nitrate of silver, say vj. gr. to ℥j. of water. Let this be applied several times during the day, but be careful that the nipple is well washed before the child again takes it. It will be very desirable to use the nipple-shield, and allow the infant to nurse through it, thus protecting the nipple from the immediate irritation of the child's mouth. When there are no fissures, but simply tenderness, borax and water, equal parts of brandy and water, or gr. ii. of sulphate of zinc to ℥j. of rose water, etc., may be employed with advantage.* In cases of mere excoriations, the tincture of catechu will oftentimes be serviceable.

Mammary Abscess.—This constitutes one of the banes of the lying-in room, inflicting upon the patient intense suffering, and oftentimes leading to tedious and protracted convalescence. My own opinion is that mammary abscess, in nineteen instances out of twenty, is the result of carelessness. It may be produced by cold, or a slight blow on the breast, etc.; but, according to my experience, the most prolific cause is neglect in not having the breasts properly drawn. For example, the child may be delicate, and not able to extract the milk; or the nurse, in the gratification of some ancient prejudice derived from a remote ancestry, does not think it proper to allow the infant to be put to the breast for two or three

* It is a good rule, especially in a primipara, to enjoin on the patient the necessity, during her pregnancy, of making daily gentle tractions on the nipples, with the finger and thumb. In this way the mucous covering becomes hardened, and can thus sustain with impunity the friction of the child's mouth. The tincture of myrrh may also be occasionally used with benefit.

days after its birth. In this way the milk ducts become greatly distended; inflammation ensues, which, if not promptly arrested, terminates in suppuration. If, therefore, the child be not able sufficiently to disgorge the breasts, have a young pup obtained; this latter is worth all the machines ever contrived for the purpose of drawing the mammæ. Gentle friction with camphorated oil, and proper support given to the breasts by means of a handkerchief placed under them, and made to cross the shoulders, will be very proper aids. The moment inflammation of the breast is noticed, leeches should be freely applied, warm fomentations and poultices should follow, and a free use of saline cathartics, together with tolerant doses of tartarized antimony. The patient should not, while the breasts are engorged, be permitted to indulge in fluids. The pup should be applied whenever the breasts become distended; and remember, *the moment pus is formed, make a free incision, and afford it an exit*. When the abscess has been opened, and the purulent secretion finds issue, the use of pieces of broad adhesive plaster, for the purpose of making pressure, will materially facilitate the process.

Diet of the Puerperal Woman.—The diet of the puerperal woman for the first four or five days should be simple, consisting of gruels, arrow-root, tapioca, boiled rice, tea and toast, soft-boiled eggs, etc. If everything pass on favorably, she may then be indulged in meat and vegetables, and begin gradually to resume her ordinary fare. There will, however, sometimes be exceptions to this restricted diet; for instance, in cases of anæmia and marked dilapidation of the forces, a generous nutrition, together with tonics, will be indicated from the first.

Recumbent Position after Delivery.—One point I wish strongly to impress upon your recollection—*keep your patient in the recumbent position for at least ten days after delivery*, and she will subsequently recognize the advantage of this rule by finding herself free from many of those troubles consequent upon too quickly “getting” up after child-birth; such as displacement of the uterus, bladder, or vagina. Consider, for a moment, the relative conditions of the uterus and vagina after the birth of the child. The uterus is large, possessing increased weight, while the vagina is relaxed, and inadequate to furnish necessary support. Therefore, if, under these circumstances, the patient rise from her bed, assume the erect posture, or walk about the room, what are you to expect but that the superincumbent weight of the enlarged organ pressing upon a frail foundation, the relaxed vagina, will necessarily lead to displacement? I do not wish you to understand that the patient is actually to continue in bed for ten days, but she should maintain the horizontal posture; let her recline on the sofa, or a cot, but always have her placed there by assistants, and not be permitted to reach it by her own efforts.

Threatened Paralysis of the Lower Extremities.—It will occasionally happen that when the patient commences to walk, she will experience more or less inability to move her limbs; there will be a feeling of numbness, with diminished sensibility. This condition of things will very naturally give rise to much anxiety. This incipient *powerlessness* of the lower extremities is usually accompanied by severe pain in the ischiatic nerve and its tributaries, and also by neuralgic sensations through the hips. I have generally observed the above phenomena after a tedious labor, and more especially after delivery by the forceps; in the great majority of instances, they are the results of pressure on the sacral plexus of nerves during labor; and what is a very gratifying circumstance is—you may assure your patient, as a general rule, that they are transitory in their character. Sometimes, however, they are more permanent, requiring the application of leeches over the region of the sacrum, together with small blisters, for the purpose of removing the congested state of the parts.

You will, however, meet with cases of paraplegia after delivery, in which there is not the slightest approach to pain. The paraplegia, in these instances, is traceable to some morbid influence transmitted by the uterus to the spinal cord. It is, in fact, an example of simple reflex paralysis. The treatment should consist in the administration internally of strychnine, with which may be advantageously conjoined the cold shower-bath applied to the spine. A very practical and interesting history of this form of paralysis as observed during gestation and after delivery, has been presented by R. Leroy D'Etiolles, Nonat, and Dr. Brown-Séquard.*

The Umbilical Cord.—From the third to the sixth day, the cord will slough, and become detached from the umbilicus of the infant. Sometimes, before this takes place, and as the consequence of the sloughing process, there will be an extremely unpleasant smell emitted: the mother becomes alarmed, sends for you, and says she is afraid her child is mortifying! If you cannot at once readily and satisfactorily explain the cause of the fœtid odor, and thus relieve the apprehensions of the parent, the mortification will be altogether on your side, should a practitioner be called in to aid you in your diagnosis! When the cord becomes detached, the umbilicus is dressed simply with a piece of burnt linen. This is an old practice among nurses, and it answers usually every purpose. Sometimes, however, there will be a small granulation sprouting from the navel, known in the lying-in room as proud flesh; the sprinkling of a few grains of calomel will generally suffice to remove it.

Under ordinary circumstances, the puerperal woman should be visited at least once every day for the first six days after delivery,

* See Lectures on Paraplegia, by Brown-Séquard, London Lancet, 1860.

and, if everything progress favorably, after this she may be seen every other day for a week or so.

Umbilical Hemorrhage.—The new-born infant—fortunately it is of rare occurrence—is liable from the third to the eighteenth day to a serious hemorrhage, which is connected more or less directly with the detachment of the cord from the umbilicus.* As soon as the cord becomes separated from the navel, it will sometimes happen that a slight oozing of blood ensues, but this is of little or no moment. It is in reference to the more formidable variety of hemorrhage from the umbilicus that we propose to say a few words at this time. It is more important to direct attention to this subject for the reason that, although a rare complication, yet it is almost always fatal. There is far from being an agreement as to the etiology of umbilical hemorrhage; in some instances it may be the result of imperfect closure of the vessels after the desiccation of the cord; it may arise from what is known as the hemorrhagic diathesis; sometimes it is accompanied with jaundice; again, it may be connected with some hereditary influence; abscess of the umbilicus may occasion it; sometimes, too, it will result from carelessness in tying the cord. It is an interesting fact that this form of hemorrhage most frequently attacks male in preference to female infants, and the mortality is greatly increased among the former.

The treatment of umbilical hemorrhage will consist in the application of astringents and pressure, the ligature, caustics; and in some instances, the actual cautery has been advised.†

Pain in the Uterus when the Child is Applied to the Breast.—Your attention will occasionally be directed by the mother to an excessive pain in the womb whenever the infant takes the breast. This might possibly give you some embarrassment if asked to explain the relation between the pain in the uterus and the tractions on the nipple; but with a little reflection you will be enabled to give a most satisfactory exposition of the circumstance. It is another interesting illustration of reflex influence; the traction of the child's mouth on the nipple excites an action in the spinal nerves, which is immediately transmitted to the medulla spinalis, and this latter, becoming the seat of irritation, imparts to the motor nerves of the uterus an influence which induces, for the time, contraction

* Although, as a general rule, bleeding does not take place until the separation of the cord, yet it should be remembered that this is not universally the case. Profuse hemorrhage may occur prior to this period, either as the result of injury, or as an idiopathic bleeding.

† The subject of umbilical hemorrhage has received some able contributions from our own countrymen: viz., Dr. John Homans (Boston Med. and Surg. Journal, 1849). Dr. Bowditch (Amer. Journal Med. Science, 1850). Dr. Bailey (Amer. Journal Med. Science, 1852). Dr. Minot (Ibid. 1852). Dr. Otis (Vir. Med. Journal, 1853). Dr. Stephen Smith (New York Journal of Med., 1855). Dr. Conant Jenkeas, (Transactions Amer. Med. Asso., 1858), and others

of this organ, and consequently pain. But you may ask, do all nursing women complain of this pain? By no means; some never experience the slightest inconvenience, while others, on the contrary, of a sensitive nature, suffer for some days after delivery much annoyance. An efficient remedy will be the introduction of a suppository of belladonna into the vagina, which will prevent the contraction and consequently the pain in the uterus.

Thrombus of the Vulva.—A Thrombus or sanguineous tumor of the vulva, as it is sometimes called, may occur as a consequence of parturition. It results from an extravasation of blood in the surrounding cellular tissue, differing in this respect from the *varicose tumor*, the blood in this latter case being contained within the vessels. Thrombus may appear in the unmarried, in the married who have not borne children, during pregnancy, at the time of labor, and subsequently to parturition. It is, although comparatively a rare affection, most commonly connected with pregnancy and labor, and this arises from the predisposition of these two conditions to the formation of the tumor—the obstructed venous circulation so engorging the vessels as to provoke, under some circumstances, their rupture from slight causes. It may happen that this rupture, giving rise to extravasation, may take place during labor, but the fact may escape attention for some days after delivery, for the reason that the head or presenting part of the fœtus may have temporarily acted as a sort of tampon, thus preventing the immediate formation of the tumor.

Causes.—These are both predisposing and exciting—among the former may be classed the various modifications incident to gestation and labor; a contracted pelvis, deformity of the soft parts, twin pregnancy, &c.; the exciting causes consist in falls, blows, external violence of any kind, rude manipulations on the part of the accoucheur, forceps delivery, or undue pressure of the presenting portion of the fœtus; coughing or vomiting may also give rise to the extravasation.

Symptoms.—One of the first and most prominent symptoms of thrombus is pain, which arises no doubt from rupture of the vessels, and also from pressure on the adjoining nerves. There is likewise more or less tumefaction, sometimes large at the very commencement, and again its development is not complete for several hours or days. When the thrombus has attained a large volume, it may impede the birth of the child, or the expulsion of the placenta; and cases are recorded in which retention of the urine and feces ensued from pressure of the tumor on the bladder and rectum. Occasionally, the thrombus may suddenly burst, causing profuse and dangerous hæmorrhage. The color of the outer covering, soon after the appearance of the tumor, will present a livid or bluish cast, and this is an important point in reference to the diagnosis of this form

of sanguineous engorgement. An interesting fact is this—the blood in these tumors, mixed more or less with purulent matter under inflammatory action, will sometimes emit a distinct stercoral odor, which might possibly lead to the erroneous opinion that the thrombus is complicated with a recto-vaginal fistula. It has been well demonstrated by the surgeon—an interesting fact for the accoucheur—that in abscesses situated in the vicinity of the rectum, it is quite usual, without any communication with the intestine, for the purulent secretion to possess the odor of fecal matter.

Diagnosis.—While to the careful practitioner, the diagnosis of vaginal or vulvar thrombus presents no embarrassment, yet it may possibly be mistaken for other affections, such, for example, as incipient abscess, varicose tumor, œdema of the labia, hernia of the bladder (vaginal cystocele), omentum, or intestine, inversion of the vagina, or uterus, &c. A thrombus, as a general rule, is characterized by rapid development, pain, the peculiar bluish color of the skin, and hardness of the tumor when the blood is simply infiltrated; on the contrary, there is distinct fluctuation when collected in the form of abscess.

Prognosis.—The prognosis of this affection is far from a favorable one; when death ensues it is most frequently caused by the profuse hæmorrhage, either external or internal; sometimes, too, by the exhausting effects of suppuration, by gangrene, inflammation of the adjoining organs, and more especially of the peritoneum.

Terminations.—The terminations of thrombus are as follows: 1st. In resolution; 2d. In suppuration; 3d. In rupture, and consequent hæmorrhage; 4th. In gangrene, and sometimes in the formation of encysted tumors of the vulva and vagina.

Treatment.—The particular treatment of this form of tumor will necessarily depend upon the circumstances attending each case; for example, should you meet with a thrombus during labor, of such magnitude as to interfere with the birth of the child, it will obviously be your duty to evacuate the effused fluid by a free incision, and then, in order to check any undue bleeding, the tampon should be employed, unless the child's head be low down in the pelvis, in which case the pressure of the head against the vessels would prove the best possible hæmostatic. There are instances, however, in which it would be judicious to attempt the resolution of the tumor, either during gestation, or subsequently to delivery; but it should be remembered, that efforts to accomplish resolution would be without avail, except when the effusion is limited, and the coverings unchanged by the progress of the swelling. The remedies most likely to effect this purpose are bloodletting, repose in the recumbent posture, and evaporating lotions.

In *post-partum* thrombus, it will be good practice, if the swelling be of very recent origin, to make applications of ice to the part, or

well directed pressure with sponges wet with ice-water. This will sometimes be followed by good results in diminishing the tumor, and inducing resolution. If, however, the applications fail in their purpose, no time should be lost in opening the tumor, and removing the coagula; should this be followed by much hæmorrhage, let injections of ice-water be thrown into the cavity, or, if it should become necessary on account of the continued bleeding, fill up the entire cavity with balls of lint or sponge well saturated with a solution of sulphate of alum, or, if at hand, a decoction of oak bark.

Weed or Ephemeral Fever.—It is proper that I should here say a few words touching a fever which, in some of its phenomena, is kindred to ordinary intermittent fever, and which sometimes attacks the puerperal woman. The characteristic of this disease is its short continuance, and hence its name, ephemeral. When it occurs—it is by no means a frequent visitor in the lying-in room—it will manifest itself about a week after delivery, rarely earlier, sometimes later.

Causes.—I believe there is no predisposing influence more decidedly operative in the production of weed than a humid, miasmatic atmosphere. Cold, however, independently of any miasmatic element, will sometimes occasion it. Want of rest, mental anxiety, and fatigue, may be enumerated among its exciting causes.

Symptoms.—The three principal phenomena, which mark this disease are—chill, fever, and perspiration. The chill is usually one of great severity and long continuance; it is accompanied by more or less pain in the head, back, and extremities; the countenance becomes changed, the eyes being sunken, and the features drawn or shrivelled; the surface, notwithstanding the cold stage, is unusually hot; the fingers present a bluish or livid color, as is observed during the chill of ordinary intermittent fever; the pulse is slightly accelerated, and its predominant feature is feebleness. The chill is followed by fever, and this second stage of the affection is accompanied by a general increase of heat, throbbing of the temples, with increased distress in the head; the eyes become intolerant of light; the tongue is coated, the mouth dry, with flushed face; the secretions, especially of the breasts and kidneys, are suppressed; and, as a general rule, the lochial discharge is arrested; the pulse becomes more uniform, and is firmer under the finger. There is often a marked depression of spirits in this stage of the disease, and the patient is despondent, cherishing but little hope of recovery. It may happen that, in the height of the febrile paroxysm, delirium will set in. The hot stage, often continuing for an indefinite period, is followed by a profuse perspiration; this sweating stage exercises a prompt influence over the symptoms just enumerated—the pulse is softer; the pain in the head subsides; the secretions are free; the

tongue and mouth moist; the lochial discharge returns. In one word, with the sweating stage the disease ceases; all the symptoms give way; the patient is no longer despondent; she lapses into a gentle slumber, and very soon recovers her wonted health. The disease is very rarely prolonged, and, under judicious therapeutics, does not return.

Diagnosis.—It is possible to confound this affection with puerperal fever; but to do so would, I think, betray great carelessness. In the first place, the severity of the chill is different from the ordinary chilliness, which is usually the prelude of peritoneal inflammation; then, again, there is here an absence of the rapid pulse, which I cannot but regard as almost pathognomonic of peritonitis; these two circumstances, therefore, with the absence of abdominal tenderness, will sufficiently indicate the diagnosis, and thus all error will be avoided.

Prognosis.—Weed is not a disease of peril; and, unless accompanied by some serious complications, may be regarded as unimportant so far as the safety of the patient is concerned.

Treatment.—The phenomena of this affection very clearly point out its management. During the cold stage, efforts should be made to break the intensity of the chill, and limit its duration. The patient should be well provided with additional bedclothes; bottles of hot water to the extremities; hot flannels, or even a mustard poultice to the epigastrium, together with warm drinks. If the bowels be inclined to constipation, I should advise, even at the very commencement, a searching cathartic. The following may be ordered:

R Submur. Hydrarg. gr. x.
Pulv. Jalapæ, gr. xv.
Pulv. Antimonialis, gr. ii. M.

Let it be followed in six hours by f. $\frac{3}{4}$ i. of castor oil; or, if there be objection to the oil, $\frac{3}{4}$ i. of Epsom salts, or the following draught may be administered:

R Sulphat. Magnesiæ, 3ij.
Infus. Sennæ, f. $\frac{3}{4}$ iv.
Tinct. Jalapæ, f. 3 i.
Mannæ, 3 i. Fiat sol.

During the hot stage, a diminution of the covering, together with cool drinks, and diaphoretic medicines, say, f. $\frac{3}{4}$ ss. of Liq. Ammoniæ Acetat., every two or three hours, as circumstances may indicate.

After the copious perspiration, which is so characteristic of the third stage of the disease, the patient is usually left in an extremely prostrated condition. Here, it will be proper to restore energy to

the system, by nutritious diet, quinine, and porter. It may not be out of place to remark that, as an exception to the general rule, Weed may assume the intermittent type, and return in paroxysms precisely like ordinary tertian fever; in such case, it is to be treated upon the same principles which regulate the therapeutics of legitimate intermittent fever.

LECTURE XXIX.

Multiple Pregnancy; relative frequency of; mortality of—**Hypothesis in Explanation of Multiple Gestation**—Plural Births apt to occur in certain Families—**Signs of a Twin Pregnancy**; their value—Twin labor not necessarily Pretermatural; how managed—**Presentation of the Fœtuses**—When one Child is born, should the Mother be told there is another in Utero?—**Delivery of the Placenta** after the Birth of the first Child—**Rules for Delivery of Second Child**—**Discrepancy of Opinion among Authors**—**Interesting Twin Case**; exhibiting extraordinary peculiarities—Can a Twin Gestation exist with only one Amnion?—**Super-fœtation**; meaning of the term—**The Possibility of Super-fœtation** generally conceded by the early Writers; not so with the men of our own times—**The Case cited by Buffon**—**The Case in the Brazils, by Dr. Lopez**—Is Super-fœtation possible in Animals; **Illustration**—Can a Woman simultaneously carry a Uterine and Extra-uterine Fœtus?—**Super-fœtation in a Double Uterus**; the instance recorded in the *Encyclographie Medicale*—**Objections to Super-fœtation** examined—the **Mucous Plug**; is it an obstacle to a second fecundation?—**The Mucous Plug in Cervical Canal of the Pregnant and Unimpregnated Female**; is there any difference between?—**Demonstrations of the Microscope**—**The Membrana Decidua**; does it prevent the entrance of the Spermatozoon into the impregnated uterus?—**Moral Considerations** involved in the Question of Super-fœtation.

GENTLEMEN—We have not yet spoken of multiple pregnancy, or that character of gestation in which there are two or more fœtuses within the uterus. Women will occasionally bring forth two, three, four, and five children at a birth; and there are recorded instances of a far greater number having come into the world at one parturition; but these cases are to be accepted with great caution. It would seem that a twin pregnancy occurs in the varying proportion of one in sixty to one in ninety-five cases. Madame La Chapelle records that, in 37,441 births there were 36,992 single deliveries, 444 instances of twins, and but five of triplets; and it is an interesting fact that, in 108,000 births in the Hotel Dieu and Maternité of Paris, from the years 1761 to 1826, there was not one example of quadruple gestation. In 129,172 deliveries in the lying-in Hospital of Dublin, there were 2062 cases of twins, 29 of triplets, and but one instance of a quadruple birth. While, therefore, instances of three, four, and five children are to be regarded as extremely rare,* yet it is quite evident from these tables, amply confirmed by all practical observers, that such is not the fact as regards twin deliveries.†

* "Non raro femina geminos fœtus parit; rarius paulo tres, neque unquam supra quinque." (Haller's *Physiologia*, 929.)

† Dr. Churchill presents the following statistics: Among British practitioners, in

There have been numerous theories promulgated in the attempted explanation of the cause of a multiple or plural pregnancy, but perhaps they may all be summed up in this general admission—that it is the result of an excessive reproductive power, sometimes possessed by the male, and, at other times, alone the attribute of the female. The procreation of twins seems to be peculiar to certain individuals and families. A remarkable illustration of the truth of this, I witnessed in the case of an American lady who married a German. This lady I confined three times successively with twins; her husband was a twin, and his aunt on the maternal side was delivered twice of two children at each birth.

Placenta and Membranes in Multiple Pregnancy.—The general rule is that, in plural pregnancy, each



FIG. 63.

foetus possesses its own membranes and placenta (Fig. 63), and, in this particular, it simulates, in all respects, a single gestation, with the exception that, sometimes, there will be an inoculation of blood-vessels between the dif-

ferent placentæ. On the other hand, it will occasionally, though rarely, happen that there is but one placenta for the two children; and it has been suggested by Dr. Tyler Smith that, in these latter instances, the one ovule has contained two yolks, and two germinal vesicles, as is sometimes observed in the case of birds—one egg with a double yolk producing two individuals. The foetuses, in the case of twins, are usually smaller than when there is but one child in the uterus, and there is also a strong predisposition to premature delivery; when there are more than two, the labor is still more apt to

257,935 births there were 3431 cases of twins, or about 1 in 75, and 43 cases of triplets, or 1 in 5561½; among the French, in 39,409 there were 336 cases of twins, or 1 in 108, and 6 of triplets, or 1 in 6568; among the Germans, in 369,080 there were 4239 cases of twins, or 1 in 87, and 38 of triplets, or 1 in 9765. Taking the whole we have 666,424 cases, and 8006 of twins, or 1 in 83, and 87 cases of triplets, or 1 in 7443.

The following he gives as the rate of mortality: In 1298 cases of twins (i. e., 2696 children) 636 were lost, or about 1 in 4; and out of 12 cases of triplets (i. e., 36 children) 11 were lost, or 1 in 3. This mortality, however, which is very large, as Dr. Churchill properly remarks must be qualified, by allowing for the great number of children whose death could not be attributed to the labor.

The mortality to the mother in twin cases has been computed as 1 in 20. (Churchill's Midwifery, fourth London Edition, p. 443.)

be premature, and the children rarely survive beyond a short time. It must, however, be admitted that there are well-authenticated exceptional instances of the reverse of this latter rule. Dr. Collins cites, within his own knowledge, two examples of *triplets* having arrived at the full period of utero-gestation, and were reared healthy children.

Signs of Twin Pregnancy.—Much has been written touching the signs of twin pregnancy, and some authors are of opinion that there are certain indications of the existence of a compound gestation, which are entirely reliable, and are as follows: A greater and more rapid increase in the size of the abdomen; the division of this latter into two distinct portions by a sort of longitudinal or oblique fissure; the movements of the fœtus on two surfaces of the abdomen at one time, with a general increase in the ordinary accompaniments of pregnancy, such as gastric irritability, œdema of the lower limbs, etc. It can scarcely be necessary to say to you that these symptoms, as a guide to correct diagnosis, are without any value; for there is not one of them which may not, under certain circumstances, be met with in a gestation in which there is only one child.

The most trustworthy evidence, prior to labor, that a twin pregnancy exists, is the fact that the pulsations of the fœtal heart may be detected simultaneously on different portions of the abdomen. But the recognition of this evidence, in order that it may possess its full weight, requires a degree of just discrimination. For example: You may detect the pulsations of the fœtal heart very distinctly at one point, and, on applying the ear or stethoscope to another portion of the abdominal surface, you may, with the same distinctness, likewise have the pulsations increased. These latter may or may not be the beatings of the child's heart. How do you distinguish the sounds? When speaking, in a previous lecture, of the fœtal heart as positive and unequivocal proof that the female is pregnant, I told you that, between the throes of the mother's heart and those of the fœtus, there was a want of correspondence; or, in other words, they are not synchronous—the latter being much more rapid than the former; and another interesting fact worthy to be recollected in this connection is—that there is also a want of synchronism in the pulsation of the two fœtal hearts in the case of twins. If, therefore, you should distinctly recognise, through auscultation, the beatings of the fœtal heart on opposite portions of the abdominal surface, and they should not be synchronous with each other, it is very conclusive evidence that it is a twin gestation. More than ordinary caution, however, will be needed in this diagnosis, for the action of the mother's heart will sometimes be heard through the abdominal aorta, and when, from any special cause, it is accelerated, these circumstances conjoined may lead to an erroneous judgment.

But, after all, it may be asked, *cui bono* are any of these signs;

for, even if we knew beyond peradventure that the woman is pregnant with twins, this knowledge would in no way aid us previous to labor. Not so, however, in a twin-birth, after the first child has been expelled; for, ignorance in this case that there is a second child to be delivered, would not only place the accoucheur in an embarrassing position, but would necessarily subject to more or less peril the safety of the mother; the diagnosis is so simple that error would be without justification. For example: as soon as the fœtus passes into the world, the uterus will continue enlarged, and the introduction of the finger within the mouth of the organ will enable the practitioner to feel the membranes of the second child, or, if these be ruptured, some portion of the fœtus itself would be recognised. Therefore, in all cases of labor, satisfy yourselves the moment the child is born whether there is or is not a second one to follow. Take nothing for granted in the lying-in chamber, which may be reduced to a matter of certainty, for the vagaries of nature are sometimes very curious, and not unfrequently capricious.

Twins not always Equally Developed.—In cases of twins it will occasionally happen that one fœtus is healthy, and perfectly developed, while the other bears all the evidences of an early arrest in its growth, and may be either living or dead; this fact is very satisfactory proof that the lives of the two children are quite independent one of the other.* Again: both children may be fully developed and alive, but one much larger than the other. Cases such as I have just mentioned will very naturally give rise to the idea of *super-fœtation*, and have been attempted to be explained by some writers exclusively upon this hypothesis; but super-fœtation is not at all necessary for the explanation of the phenomena—they may exist independently of any such influence. For example: this inequality may be due either to some original defect in one placenta, or funis, or one fœtus; or it may result from compression exercised in utero by one child on the other. There can be no doubt of the occasional operation of either of these influences; and it is proper that you should bear the circumstance in memory.

A Twin Pregnancy not Incompatible with Natural Labor.—A twin pregnancy does not necessarily imply that the labor will not be natural; on the contrary, you will observe in practice that nature, unless there should be some complication, such as malposition of the fœtus, etc., will be adequate to accomplish the delivery through her own resources. The labor, however, as a general rule, will be more protracted, because the uterus having undergone a

* There is no difficulty in accumulating proof of the independence of the two fetal lives; but the following is certainly a most interesting demonstration of the fact: A pregnant woman was attacked with small-pox and recovered; she was soon after delivered of two children, the one having received the small-pox in utero, the other not. The case has been reported in the *Journal de Médecine*, edited by Van dermeide.

greater degree of distension loses in proportion its contractile tonicity, and, therefore, a longer period is needed for the achievement of the process. And again: when there is more than one fœtus in utero, the organ cannot concentrate its power as in a single gestation.

There is much variety in the presentations of the two fœtuses; but it is estimated that, in about two thirds of the cases, each child presents the head, the largest usually descending first. Again: the head of one child, and one of the pelvic extremities of the other (Fig. 64), will be found at the superior strait. These are the most frequent of the presentations, but they are susceptible of the same variety of modification observed when there is only a single fœtus within the womb; and it is also worthy of remark, that malpositions of the fœtus are more frequent in the case of twins than in a single pregnancy.



FIG. 64.

The following table, exhibiting presentations of the fœtus in 808 labors with twin children, has been constructed by Prof. Simpson* from the returns of twin births, as observed in the Dublin and Edinburgh Lying-in Hospitals, and among the patients of the London Maternity Charity

Reporter.	Total number of Cases.	Number of Head Presentations.	Number of Pelvic Presentations.	Number of transverse Presentations.
Clarke,	126	73	53	
Collins,	449	309	133	7
Hardy and } McClintock }	190	122	62	6
Ramsbotham,	772	532	221	19
Simpson,	30	23	7	
Reid,	48	25	22	1
Total,	1615	1084	498	33
Proportions among twin children,		67 in 100	1 in 3	1 in 49†
Proportions among all births,		96 in 100	1 in 31	1 in 224

In order that you may appreciate how it is, that two children

* Simpson's *Obstetric Works*, vol. ii, p. 133.

† The same tendency to malpresentation also exists in the case of triplets.

can come into the world without involving the necessity of artificial interposition, we will suppose a twin case, in which the head of each fœtus presents. As a general principle, under this condition of things, one of the cephalic extremities is more moveable than the other, and its tendency is to recede slightly, so as to afford more space for the descent of the head of the other fœtus; this recession being much facilitated by the smooth and unctuous state of the parts. But this surrender of place on the part of one of the children does not universally occur, and when it does not, there will necessarily be more or less obstruction to the delivery.

So far as the position of the fœtuses is concerned, the same rule applies in a twin gestation to which we have already alluded, when discussing the subject of labor in a single pregnancy, viz., in order that nature may expel the children of her own volition, one of the obstetric extremities must present at the upper strait.

It should be recollected that, when the first child presents the head, the delivery will be much easier than if the feet should present, for the obvious reason, that by the time the extremities and body of the child have escaped into the world, the uterus, occupied with the other fœtus, will not be able to throw its expulsive forces so efficiently upon the head as it rests in the vagina, and, consequently, from this cause, there will be more or less delay in its birth.

Management of a Twin Labor.—Let us now inquire how a twin labor, in which there is no complication, is to be conducted. You are at the bedside of your patient; she is in labor; the child is born; you observe the womb to be still enlarged, and a vaginal examination assures you that the uterus contains another fœtus. In this contingency, will it be proper for you to say to your patient: "Oh! madam! I congratulate you; there is another baby coming!" There is much difference of opinion among authors as to whether any such disclosure should be made, until the birth of the second child precludes the possibility of further concealment. Many are of the belief that an announcement of this kind would have an injurious effect on the patient; and whether it would or would not will depend very much upon circumstances. For example: some females have an uncontrollable repugnance to become mothers; these, however, are in the vast minority; others, again, may have a passion for children, but either on account of ill health or limited pecuniary means, they may be indisposed to an increase of their little responsibilities.

In such instances, the accoucheur will be called upon to exercise a sound judgment as to the propriety of prematurely, and without consideration, announcing the approaching advent of a second child after the birth of the first; for without some little diplomacy on his part, the abrupt intelligence might be productive of more or less harm to the patient. On the contrary, you will meet in the

rounds of professional life with women, whose great ambition it is to rear large families; and every additional child is but another link in the chain of their earthly bliss. Here, then, there would not only be no objection, but, on the other hand, every motive for a prompt announcement of the glad tidings. It is, therefore, as you perceive, a mere question of expediency as to the course to be pursued; and that expediency must be governed by the peculiar circumstances which may surround each case.

Management of the Placenta.—This matter being disposed of, the next important consideration is—what is to be done with regard to the placenta belonging to the child, which is already delivered. In the first place, allow me to remark that, in cases of plural delivery, it will be proper to deviate from the rule I gave you in speaking of a single birth, and, instead of applying but one ligature, two should be employed; not that two are always necessary, but as there are very frequently vascular inosculations between the borders of the placenta, if the umbilical extremity of the cord were left open, the blood, which would escape through it, might prove fatal to the child yet *in utero*. What are you to do with regard to the placenta itself? My advice is to do nothing. Do not attempt to extract it; but wait until the birth of the second child; the two placenta are then usually thrown off together. The danger of making any effort to deliver the placenta after the expulsion of the first child is this—you may too abruptly detach the other placenta from the uterus, and thus incur all the perils of hemorrhage. It will occasionally, however, happen that the after-birth will very speedily follow the delivery of the first child. This, when it occurs, is all right; it is nature's work, and there can be no objection to it.

But, remember, there is another child in the womb. What course is to be pursued touching it? This is an important question, and needs some little consideration. The opinions upon the practice to be adopted are by no means concurrent; they seem to embody two directly opposite principles. For example, you are told, on the one hand, as soon as the first child is born, not to delay, but to proceed at once with the extraction of the second; and, on the other, you are admonished against the evils of interference, and are strictly enjoined to commit the delivery to nature. The true test, I think, of the wisdom of either of these exclusive rules, is to contrast them with what really occurs when nature is left undisturbed, and permitted to pursue her own course without interruption. In the great majority of cases in twin births, statistics show that the second child is delivered by the resources of nature alone, from fifteen to thirty minutes after the birth of the first. In 212 instances recorded by Dr. Collins, in which the interval is accurately marked, in 38, it was five minutes; in 29, ten minutes; in 48, fifteen

minutes; in 23, twenty minutes; in 30, half an hour; in 5, three quarters of an hour; in 16, one hour; in 8, two hours; in 3, three hours; in 5, four hours; in 1, four and one half hours; in 3, five hours; in 2, six hours; in 1, seven hours; in 1, eight hours; in 1, ten hours; and in 1, twenty hours.

It is, therefore, incontestably true that the general rule is, that nature, if left alone, will speedily cause the second child to follow the delivery of the first; in view of this important fact, I should advise you, unless some complication such as hemorrhage or convulsions should interpose, to wait for at least half an hour before attempting any thing to expedite the birth of the second child; even then, such interference will not always be justifiable; for it will sometimes occur that the second child—for instance, in the case of a premature delivery—may not have reached its maturity; and there are well authenticated instances of this latter kind, in which the child has continued to remain *in utero* until its physical organization was so far completed, as to render it capable of an external or independent existence.*

It is very generally recommended, as soon as the first child is delivered, to rupture the membranous sac of the second fetus, with a view of expediting its expulsion. I cannot concur in this opinion, for I do not perceive its utility. According to my own experience, it is far better practice to commit the entire management of the second child to nature, all things being equal. What, in fact, when rigidly analyzed, is a twin labor, free from all complications, and which, consequently, it is within the ability of nature to accomplish without the interposition of science? Is it not, in strict construction, two successive parturitions developing the same phenomena, and consummated by the same means? Both require contractions of the uterus, both demand that one of the obstetric extremities of the fetus shall present; and does not nature, in ordinary labor, prove herself, as a general principle, competent to rupture the membranous sac, and does she not usually produce the rupture at the opportune moment? Therefore, unless there be some positive indication for so doing, I would urge you not to adopt, as a stereotyped practice, the plan of rupturing the membranes of the second fetus immediately after the delivery of the first; but submit patiently for at least half an hour, to the ministrations of nature herself; and if, after the lapse of this period, there should be no manifestation of progress, it would be desirable, by gentle frictions over the abdomen, to endeavor to stimulate the uterus

* Dr. Merriman cites the following case reported in the *Medical and Physical Journal* for April, 1811, vol. xxv., p. 311—in a case of twins, the second child was retained for fourteen days after the birth of the first, and the writer remarks that another instance had come to his knowledge, in which six weeks had elapsed between the birth of the twins.—[Merriman on Difficult Parturition, p. 99.]

to increased effort, and it may also be proper to rupture the membranes.

There can be no objection to the employment of ergot in these cases, provided always that the child presents naturally; for the uterus is apt, through previous effort, to become more or less defective in action, and the influence of ergot will oftentimes be very marked in evoking its contractility. Should, however, these means fail in producing the expulsion of the fetus, it will be proper, after waiting two hours, to introduce the hand, and bring down the feet; or if the head have descended into the pelvic excavation, the forceps should be had recourse to; the necessity as well as the economy of this mode of practice, are abundantly sustained by the important fact that, according to accurate observation, the second child will usually be sacrificed if more than two or three hours elapse after the birth of the first.

In twin labors, it is important that the accoucheur should not leave the room of his patient until the delivery of the second child has been completed; this, as a general rule, should be scrupulously observed. As I have mentioned to you, there are occasionally some exceptional cases in which a compliance with this precept would not be practicable; for there are instances on record in which the second child has not been expelled for two, three, and more weeks subsequently to the birth of the first. Therefore, while in the observance of the general rule, it will be well to bear in mind the exceptions.

The following is an interesting and instructive case of twins,* to which I was called some time since. Mrs. K—, aged 32 years, the mother of three healthy children, consulted me on the 6th of October, 1855, in consequence of an anxiety she experienced in not having felt for the preceding week the motion of her child, she then being about six months pregnant. She remarked that, a few days before consulting me, she had become very much frightened by a horse, and since that time had not felt life. With the exception of words of encouragement, and suggesting the occasional use of the tincture of hyoscyamus with a view of quieting her nervousness, nothing was ordered in her case. On the 6th of November following, the husband requested me to visit his wife, stating that she supposed herself in labor, and was flowing very profusely, having been troubled more or less in this way for the last week. In an hour from the time I received the message, I saw the patient, accompanied by my son, Dr. Henry M. Bedford, and found her

* Placenta previa in a case of twins, which were expelled from the uterus, after a seven months' gestation, with one placenta, one amnion and chorion; both coriis inserted into the placenta nearly in juxtaposition; each fetus presenting evidences of incipient hydrocephalus; and each bearing marks of having been dead for two or three weeks. [See *Diseases of Women and Children*, p. 380.]

with labor-pains just commencing, and flowing quite freely. In making a vaginal examination, I discovered the os uteri dilated and soft, and distinctly felt a doughy substance presenting, which I recognized to be the placenta, and which at once accounted for the hemorrhage. With the amount of blood the patient was losing, together with the fact that the mouth of the womb was soft and dilatable, it was obviously my duty to lose no time, but to proceed without further delay to the delivery. In accordance, therefore, with this object, I carried my hand to the neck of the uterus, and separated about one fourth of its attachment to the placenta, which enabled me to feel the presenting part of the fœtus, which I soon recognized to be the breech. It was my intention at once, in separating the placental attachments, to introduce the hand into the uterus, and terminate the delivery by bringing down the fœtus. As, however, the uterus contracted with great efficiency soon after I had ascertained the presentation, and as it was quite evident that the breech of the fœtus was descending into the pelvic excavation, I judged it advisable to submit the birth to nature.

The pains increased so rapidly in force, that not more than five minutes elapsed before the expulsion of the fœtus was accomplished. As the child was passing into the world, with one hand applied to the abdomen of the mother, I soon discovered that, although there was a sensation of hardness imparted to my hand, the uterus was but slightly diminished in volume; at the same time my attention was drawn to the peculiarity exhibited by the umbilical cord. It occurred to me, at first view, that it was an example of what authors have described as the *knotted* cord, two instances of which I have had in my practice. In this character of cord there are distinct knots, formed most probably by the evolutions of the fœtus *in utero*. I soon observed, however, that no such peculiarity existed in the present case. The enlarged uterus caused me to suspect the presence of another fœtus, and, in carrying my hand up, my suspicion was confirmed. The uterus contracted with energy, and, in less than ten minutes, the second fœtus was expelled. Both were in a state of decomposition.

The peculiarity of the umbilical cord is explained as follows: The cord of one fœtus was completely twisted around that of the other in its whole extent, presenting the aspect of the *knotted* cord. On the expulsion of the second fœtus, the uterus became diminished in size, and was felt in the hypogastric region well contracted. I then passed my hand, and removed the placenta. *There was but one after-birth; the two cords were inserted into it nearly at the same point. There was but one chorion, and one amnion. The two fœtuses were about equally decomposed, presenting the strong probability that their death was simultaneous.* About an hour and a half after the delivery, the fœtuses and placenta were seen and

examined by my colleague, Prof. Van Buren, and also by Dr. George T. Elliot, then resident physician of the lying-in hospital. I should have remarked that the cord which was twisted around the other, having its length curtailed, and also decomposed, became detached from the placenta on the birth of the second fœtus. Prof. Van Buren immediately detected, by means of the blowpipe, its place of attachment, which was in juxtaposition with the other cord.

In reviewing the circumstances connected with this delivery, there are several points of interest which naturally present themselves to our consideration, and when all the peculiarities of the case are examined they certainly do present an aggregate which is not only unusual, but, in my opinion, without a parallel. What, then, are the peculiarities to which I allude? They are as follows: 1. Implantation of the placenta over the cervix uteri; 2. One placenta, one chorion, and one amnion; 3. The insertion of both cords into the placenta in juxtaposition; 4. Each fœtus exhibiting evidences of incipient hydrocephalus; 5. The probable simultaneous death of the two fœtuses. These constitute the peculiarities of the case; and I repeat, in conclusion, as far as my knowledge extends, they stand alone. But what imparts special interest is the fact of one placenta which is single and perfect in itself; not composed of two united into one, the points of union easy of recognition, as sometimes happens in plural gestation, but it is one entire placental mass.

There is no double set of membranes; there is, on the contrary, one distinct amnion, and one chorion. In fact, there is here, with the exception of the two cords, precisely what we should expect to find in a parturition in which there is but one fœtus. Some authors have doubted the possibility of a twin-birth with only one amnion, without the cohesion of the embryos. But the case under consideration is an unqualified demonstration that it is possible for twins to exist with but one amnion, and yet no cohesion of parts ensue. Another interesting fact connected with this history is, that although there is but one placenta, and both cords are inserted into it, yet the umbilical vein and two umbilical arteries belonging respectively to each cord, have a distinct circulation; or, in other words, do not communicate with each other. If, to this circumstance be added the fact that there was not the slightest evidence of decomposition in the placenta, but, on the contrary, an aspect of freshness, such as exists in the case of a healthy living fœtus, we then have the curious coincidence of a healthy, fresh placenta coexisting with two fetuses bearing the evidences of having been dead for some two or three weeks.* This certainly presents a point for physiological discussion. Again: would it have been possible in

* There are cases recorded showing that the amnion may also remain for some time without undergoing decomposition.

this instance for one fœtus to have survived the other, as sometimes occurs in twin births? My opinion is decidedly in favor of the negative.

The mother had a prompt recovery; and is now in the enjoyment of good health.

Super-fœtation.—It will be proper, at this time, to allude briefly to the subject of super-fœtation, which implies the possibility of a second fecundation subsequently to one which already exists; or, in other words, the possibility of a woman being in gestation with two fœtuses of different ages, and consequently generated at different periods. Among the early writers there was a general concurrence of opinion on this subject, and the doctrine of super-fœtation was accepted with singular unanimity. Such, however, is not the case with the men of our own times; and among others, who doubt the possibility of super-fœtation, may be named the distinguished authorities—Drs. Churchill and Ramsbotham.

There can be no doubt that two fecundations may take place within a very short period of each other; this fact is irresistibly established by cases, the authority of which is beyond all cavil. Some of you are, perhaps, familiar with an example of this kind quoted by Buffon, and more or less constantly referred to in obstetric works. It occurred in South Carolina. A white woman, immediately after receiving the embraces of her husband, was coerced, through fear of her life, to have intercourse with a negro; the result being that she gave birth to two children, one white, and the other mulatto. In the American Journal of Medical Sciences for October, 1845, a somewhat similar case is mentioned on the authority of Dr. Lopez. The mother, in this instance, was a negress, and having had in succession intercourse with a white and black man, produced two children, one mulatto, the other black. An extremely interesting instance, in proof of the possibility of super-fœtation, is recorded by Dr. Henry in his valuable monograph on this subject; it occurred in the Brazils. The natives of that country are copper-colored, but among them are many negroes and whites. A Creole woman, a native, brought into the world at one birth three children, of three different colors, white, brown, and black, each child exhibiting the features peculiar to the respective races.

But such freaks of nature are not confined to the human family; for the same circumstance has been observed in animals. It is related by Mende, that a mare covered first by a stallion, and shortly afterward by an ass, produced at one parturition a horse and a mule; and you will find an analogous case reported by Dr. Read of Andover, with the simple difference that the mare was covered first by the ass, and in two or three days subsequently by the horse.

The cases to which we have referred may, I think, be safely regarded as indisputable examples of super-fœtation; but it should be recollected that, in all of them, if human testimony be worth anything, the procreative acts occurred at short intervals. Very different, however, is it with those reputed instances of a well-developed and mature child being born, followed by another, the period of time varying from one to several months. In these latter cases, in the absence of very positive evidence to the contrary, I should be disposed to refer the phenomena, not to super-fœtation, but to an original twin gestation, in which one of the fœtuses was developed at the expense of the other, the retention of the second being necessary for its proper subsequent maturity.

A very remarkable instance occurred in Strasbourg, the particulars of which will be found in the *Recueil de la Société d'Emulation*—a woman, aged thirty-seven years, brought forth a mature and healthy child on the 30th of April; on the 17th of September following (about one hundred and forty days after the previous birth), she was again delivered of a fully developed infant. After her death, an autopsy proved that the uterus was single. Dr. Tyler Smith, an accurate observer and reliable authority, mentions the following interesting case as having been seen by him in company with Mr. Eardley. I quote his own words: "A young married woman, pregnant for the first time, miscarried at the end of the fifth month, and some hours afterward a small clot was discharged, inclosing a perfectly fresh and healthy ovum of about one month. There were no signs of a double uterus in this case. The patient has menstruated regularly during the time she had been pregnant, and was unwell three weeks before she aborted. She has since been delivered at the full term."*

The two examples just cited, admitting their accuracy—and I see no reason to doubt it—are very strong facts in favor of super-fœtation resulting from remote procreative acts; nor do I, for a moment, think them explicable on the ground of a twin gestation.

It is now well established, and I believe the fact has met with universal concession, that a woman may become impregnated while she is carrying an extra-uterine fœtus; that is, she may simultaneously have a uterine and extra-uterine fœtation. Horn, Mende, Montgomery, and others, cite cases in proof of this circumstance.

There are also examples of super-fœtation occurring in a double uterus; one of the most notable and trustworthy instances of this nature is recorded in the *Encyclographie Medicale*, for February, 1849. A female, a native of Modena, became for the seventh time pregnant in 1817; at the expiration of nine months, she was delivered of a healthy and fully developed male infant. The placenta

* London Lancet, 1856, for August, p. 131.

was properly expelled, and the patient soon recovered her health. It was, however, observed that one half of the abdomen continued enlarged, and the movements of a fœtus were very distinctly recognized. A month subsequent to her last parturition, she again brought into the world a living male child, which presented all the evidences of health and full development. Years afterward this woman died of apoplexy; an autopsy was had, and the interesting circumstance was revealed that there was a double uterus with a single cervix.

The objections urged by Drs. Churchill, Ramsbotham, and others, against a true and unequivocal super-fœtation are mainly founded on the supposed impossibility of a second fecundation, while the uterus is already occupied with the product of a previous one; and they maintain that this impossibility arises, in the first place, from the fact that the os uteri is closed by a tenacious mucous plug, and, secondly, that the membrana decidua being a complete sac, occluding the mouth of the womb as well as the uterine orifices of the fallopian tubes, the spermatozoon cannot gain admission, and, therefore, fecundation cannot be consummated. Let us briefly examine these objections: 1. *The mucous plug.*—It is now well understood, through the revelations of the microscope, that there is no essential difference in the mucus existing in the cervical canal of the pregnant woman, and that generally present in the same canal in an unimpregnated female; and as, in the latter case, in order that the fecundation may be accomplished, the spermatozoon must of necessity enter the uterus through this mucus, so may it do so when gestation already exists, and thus generate a second fœtus. 2. *The membrana decidua.*—Until very recently, as has already been remarked, the original description of the membrana decidua, and membrana reflexa as given by Hunter, was almost universally adopted by obstetricians; and with this adoption, it would at once seem impossible, after the formation of the decidua, for anything to enter the cavity of the uterus, without first pushing the membrane before it; for the decidua, as described by Hunter, is veritably a closed sac, and completely occludes the three openings of the womb, viz., the os, and the two orifices of the fallopian tubes. But Hunter's theory, like many other things which were brilliant in their day, has been compelled to recede before the lights and progress of science; and what once found universal concurrence is now thrown aside.

Physiological research, aided by the clever microscopists, has demonstrated that Hunter's view was little less than a fiction; and it is now established beyond a peradventure, that the membrana decidua is but a thickening or hypertrophied condition of the mucous coating of the uterus. It is, therefore, not a closed sac, and, consequently, offers no impediment, at least during the early periods of gestation, to the ingress within the uterine cavity of the spermato-

zoon—the true and exclusive fecundating element. These objections, therefore, in opposition to the doctrine of super-fœtation are not valid ; and when we take into account the important and undeniable evidence on record—irresistible, and, therefore, conclusive—that cases of this description have actually occurred, both in the human subject and in animals, super-fœtation must be recognized not only as within the range of possibility, but as having been more than once practically illustrated.

Super-fœtation in a Moral Aspect.—There is another view in which this question of super-fœtation is to be regarded ; and it will occasionally need the soundest judgment and discrimination on the part of the practitioner, in order that suspicion may be allayed, and the breaking up of the dearest social relations prevented. Let us suppose a case. A gentleman, shortly after the impregnation of his wife, is compelled to leave her on business, which will require an absence of a year. During this time, she brings into the world two children at an interval of some weeks. Popular opinion, if it be allowed to poise the scales of justice, will undoubtedly decide against the fidelity of the wife ; and the husband, whose heart-strings are broken by this unlooked for dishonor, may, perhaps, in the hour of his anguish, apply to one of you to know whether it be possible for a woman to be delivered of two children within a short period of each other, consistent with conjugal purity. If the case just hypothesized should occur to me, and I should be selected as the arbiter of that man's peace of mind, and the ægis against the suspicion of his wife's chastity, I would, without hesitation, unless the proof against her should be overwhelming, decide in her favor—and upon the broad ground that the two births were the result of a twin gestation. According to the doctrine of chances, the presumption of the correctness of this decision would be twenty to one ; for, as has already been mentioned, it is not of extremely rare occurrence in twin pregnancy for an interval of days and weeks to elapse between the respective deliveries, for reasons which we have previously stated ; whereas, on the other hand, super-fœtation may be properly classed among the exceptional phenomena of life. A broader ground still, however, on which such a decision may be based is the Christian principle—*it is better that ninety-nine guilty should escape than that one innocent be condemned*. Human happiness and a wife's honor, I hold, to be too precious to become the sport of a mere contingency ; in all cases, therefore, involving the sacred rights of the household, look to evidence, both presumptive and positive ; and remember, in rendering your verdict, that humane maxim in law—*a reasonable doubt is the property of the accused*.

LECTURE XXX.

Inversion of the Uterus—Often connected with Mismanagement of Placenta—Can Inversion occur in the Unimpregnated Woman?—Causes of Inversion—What are they?—Inversion most frequently the result of Carelessness or Ignorance—Dublin Lying-in Hospital Statistics—Inversion Complete or Incomplete—Diagnosis of each—Chronic Inversion, confounded with Prolapsus, Procidencia, and Polypus—How to be Distinguished—Treatment of Inversion when either Complete or Incomplete—Does an Inverted Womb ever become Spontaneously Restored?—The case of Spontaneous Restoration cited by Baudelocque—In Chronic Inversion, when the Organ cannot be replaced, is Extirpation of the Uterus Justifiable?—Importance of the Question—The Records of Successful Extirpation—Case of Malpractice in which an Inverted Uterus was forcibly torn from the Person of the Patient, having been mistaken for the Placenta.

GENTLEMEN—It remains for us now to speak of an accident which, though rare, will sometimes complicate labor; and it is very apt, also, to be accompanied by more or less hemorrhage—I mean inversion of the uterus, in which, when complete, the organ is turned inside out. It is especially proper that your attention should be called to this accident at the present time, for the reason, that frequently it is more or less directly connected with the extraction of the placenta.* In his excellent *Essay on Inversion of the Uterus*, the late Mr. Crosse† remarks that, in 350 out of 400 cases of inverted womb, which he had collected, the complication was a consequence of parturition; of the remaining fifty cases, forty were supposed to have been connected with the presence of a polypus in the cavity of the organ.

It is maintained by some writers that inversion of the womb is possible, and has actually occurred in women who have never been impregnated, and when the uterus is in a state of entire vacuity. The accuracy of this latter opinion I very much doubt, for it seems to me physically impossible that a contracted womb should become inverted unless it contain a foreign substance, such, for example, as a polypoid growth, in which case the accident has taken place.

One of the pre-requisites of this peculiar form of displacement is necessarily more or less relaxation or inertia of the organ.

* It is right, however, to state that inversion of the uterus may take place some days after the delivery of the child, and the removal of the placenta. An^d and Teller both cite examples of this kind. In the case of the former, it occurred on the twelfth day; in that of the latter, on the tenth day.

† Part II. p. 70.

Causes.—The causes of inversion at the time of labor are diverse—such as the sudden and rapid expulsion of the fœtus; undue and forcible tractions on the cord, while the placenta is still in adhesion with the womb; violent coughing immediately after the exit of the fœtus, etc.; delivery in the standing position, especially when the delivery is abrupt in consequence of increased capacity of the pelvis. It is likewise alleged that too short a cord, either in consequence of a congenital shortness, or because of its encircling the neck or body of the child, should be enumerated among the causes of this accident. My own opinion is that, admitting the cord occasionally to be extremely short—and there are instances of its measuring from six to ten inches only—it cannot with propriety be classed among the causes capable of producing inversion; for admitting the funis to present but eight inches in length, this would be sufficient, after the expulsion of the head, to allow the escape of the remaining portion of the fœtus, without necessarily involving the inversion of the womb, through tractions on the cord. Polypus, whether of the unimpregnated uterus,* or as an accompaniment of gestation, may result in inversion of the organ; this you can readily understand, for the weight of the polypus, especially if the uterus be somewhat relaxed, would naturally tend to the production of the accident. Inversion is occasionally spontaneous, and this would be more likely to occur in women who have borne many children, in whom the muscular parietes of the uterus are very much relaxed, and the labor rapid.

I think, however, the fact must be conceded that, in the great majority of instances, this form of uterine displacement is due manifestly either to carelessness, or gross ignorance on the part of the accoucheur; as an evidence of the truth of this opinion, you will observe that, in well regulated lying-in hospitals, inversion of the uterus is among the very rare complications of labor. It is an interesting circumstance to record that, in 71,000 cases of delivery, which occurred in the Dublin Lying-in Hospital, there was not a solitary example of inversion.† We, therefore, are to look for this accident principally among the records of private practice. There is an interesting case recorded of congenital inversion. It was reported to the French Academy of Medicine by Dr. Williams,‡ of Metz. The girl menstruated with regularity.

* Instances are recorded in which inversion of the virgin womb has occurred, in consequence of the presence of a polypoid tumor.

† No example of acute *inversio uteri* has ever fallen under our notice, and the accumulated experience of Drs. Clarke, Labatt, Collins, Kennedy, and Johnson, in this hospital, does not furnish a single instance of the occurrence of this accident, though the number of women delivered during their united masterhips amounts to upwards of seventy-one thousand. [Hardy and McClintock's *Practical Observations*, p. 223.]

‡ Dublin Med. Press, Nov. 1843.

Grades of Inversion.—The uterus may be either partially or completely inverted; in the former instance, the fundus is depressed, and the internal surface may or may not reach the *os uteri*; whereas, in complete inversion, the inner surface protrudes through the mouth of the uterus—in a word, the organ is turned inside out.

When this formidable accident presents itself—and it is in all truth formidable, oftentimes involving the life of the mother—it is of cardinal importance that it should be promptly recognised, for, as we shall remark, when speaking of the treatment, the difficulty of restoring the organ to its original position will usually be proportionate to the time which has elapsed from the moment of its displacement.

Diagnosis.—If you be in attendance upon a female in labor, and inversion occur, there can be no excuse for your ignorance of the circumstance; for you have been told until, I am sure, the repetition must ring in your ears, that, as the child is passing through the maternal organs, your duty is to ascertain, by placing the hand on the hypogastric region, whether or not the uterus responds to the expulsion of the fetus—in other words, whether it is contracted. Suppose, then, in observing this rule—and to neglect it would be extremely culpable—you are unable to feel the uterus at the lower portion of the abdomen; but, in lieu of the organ, there should be distinctly recognised a cupped-like depression. Why, what would this state of things indicate? If there be any truth in evidence, the irresistible deduction would be that the womb had become inverted either partially or completely. Whether the former or latter, would soon be revealed by the absence or presence of a large tumor protruding into, and sometimes even beyond the vagina. All doubt as to the true nature of the case would be promptly dissipated by a digital examination of the tumor itself. For example, if the inversion be incomplete, the finger, in being carried up to the *os uteri*, would distinctly feel the internal surface of the organ thrown downward, but still within the uterine cavity. On the contrary, in complete inversion, the tumor will occupy the vagina, and occasionally extend beyond it, while the *os uteri* will be found above, and, as it were, forming a species of stricture around the upper portion of the inverted organ. In addition to these evidences, the tumor would be sensible to the touch, and the placenta attached to the inverted surface, or, if separated from it, the fact of its previous adhesion would be manifest from the peculiar aspect or feel of the part.

When the uterus is in a state of complete inversion, the fallopian tubes, ovaries, and uterine ligaments, are necessarily drawn into the cupped-like or funnel-shape cavity formed by the depression of the external surface of the fundus; and there are instances recorded in which the small intestines, the bladder, and a portion of the rectum,

had also become prolapsed into the cavity. But the descent of these latter organs must rather be regarded as exceptions to the rule.*

Is it possible to mistake Chronic Inversion for something else?—

In a case of recent inversion, I repeat, it can scarcely be conceived that there could be an error of diagnosis; but where the displacement has become chronic, there might possibly be some embarrassment, and this leads me to dwell for a moment on certain morbid phenomena with which inversion of the uterus might, without due thought, be confounded—such as prolapsus, procidentia, polypus, and other tumors connected with the womb.

In simple prolapsus of the organ, the apex of the tumor is downward, the base upward, and, besides, the os tincæ will come directly in contact with the finger.

In procidentia, the apex is downward, the base upward, there is also the os tincæ at the most pendent portion of the tumor.

In polypus, the base is downward, the apex upward, consisting of a pedicle attached to the uterus; there is of course no os tincæ, nor is there, as a general rule, any sensibility on pressure.

In inversion, the apex is downward, the base upward, and there is no os tincæ to be recognised at the lower portion of the tumor.

If, therefore, these distinctive differences be borne in memory, it seems to me that an erroneous diagnosis is barely possible; and yet there are, unhappily, authenticated instances in which a ligature has been applied to an inverted uterus under the conviction that it was a polypoid growth, and the life of the patient thus sacrificed through want of judgment. Death, however, is not always the consequence of removal of the uterus by ligature, as will presently be shown when speaking of extirpation of the organ.

Inversion of the uterus, I have remarked, is a formidable complication, and very frequently results in the destruction of the patient; death, under these circumstances, may ensue either from excessive hemorrhage, or from shock to the nervous system, and sometimes even from convulsions. Yet, on the other hand, the chronicles of obstetric medicine are not without satisfactory evidence that women have survived for many years this displacement, after having proved rebellious to every effort to accomplish the restoration of the organ to its original position.

Mr. Crosse states that, in seventy-two out of one hundred and nine fatal cases, death occurred within a few hours; in eight within a week, and in six others in four weeks; of the remaining twenty-three, one died at the fifth month, occasioned by an opera-

* Levret reports a case of an inverted uterus, in a woman seventy years of age, containing a portion of the rectum, bladder, and small intestines, together with the fallopian tubes and ovaries. [Observations sur la Cure Radicale de Plusieurs Polypes de la Matrice. Ob. 8, p. 132. Paris, 1762.]

tion; one at eight months; three at nine months, and the others at various periods from one to twenty years.*

TREATMENT.—Let us now suppose that you have a case of incomplete inversion. How is it to be managed? No time should be lost in efforts to reduce the displacement. The patient should have all the advantage of position, being placed on her back, and the pelvis slightly raised above the plane of the thorax; it is especially important to remember that, in this form of uterine displacement, there is very commonly retention of urine in consequence of the pressure of the tumor against the neck of the bladder. Therefore, do not omit, as a preliminary measure, to evacuate the urine by the introduction of the catheter. If the placenta be still in adhesion with the uterus, do not on any account make an effort to detach it either by tractions on the cord—for these would only tend to increase the inversion—or by manipulations with the hand carried into the uterine cavity. On the contrary, what you should do is cautiously to introduce the hand within the mouth of the uterus, and with the dorsal surface of the fingers exert gentle but uniform pressure upward against the inverted portion of the organ—and in this way, it will be made, generally speaking, to resume its position; this being accomplished, frictions on the abdomen, a small piece of ice introduced into the vagina, or the administration of ergot—should the uterus not contract with sufficient energy to separate the after-birth—may be resorted to with a view of evoking increased action. The placenta being separated, its extraction is to be accomplished according to the rules indicated in a previous lecture.

But how are you to proceed with regard to the management of the uterus when in a state of complete inversion? In this case, too, promptness is one of the great elements of success—indeed, if even a few hours lapse after the accident, it will be extremely difficult to effect the reduction. Therefore, remember that, under these circumstances, action simultaneous, if possible, with the accident will prove the truest economy. In complete inversion, there will be one of two things—the placenta will either be separated from the organ, or it will be in connection with it. In the former instance, the tumor should be gently grasped by the hand, and a continued but cautious pressure made in the direction of the respective straits of the pelvis. This pressure, if faithfully persisted in, will oftentimes be productive of the happiest results—restoring the uterus, and protecting the patient against the annoyance and dangers of failure in the attempt at reduction.

When, however, the placenta is still adherent to the inverted organ, there is some difference of opinion as to the proper course

* *Op. cit.*, p. 170.

to be pursued. Authors are divided upon this subject, some following the counsel originally, I think, given by Puzos of previously detaching the after-birth, for the reason that in so doing the volume of the tumor will be diminished, and the possible danger of its subsequent extraction avoided. Others, again, maintain that the preliminary detachment of the after-birth is not necessary, and they proceed at once to replace the uterus without any reference whatever to the deciduous mass.*

I should advise you, gentlemen, to adopt neither of these suggestions peremptorily; it is not wise—and science repudiates the notion—to have stereotyped rules of conduct for the sick room. You should have stereotyped principles, but the application of these principles must be governed by the circumstances, which may surround each individual case. Therefore, the plan which I suggest for your consideration is this—if the placenta be considerably detached at the time of the inversion, you may, before attempting to reduce the displacement, complete its separation, and then immediately, in the manner already indicated, proceed with your manipulations to accomplish the restoration of the organ. All things being equal, it is, in my judgment, far more desirable to attempt to replace the inverted uterus while the placenta is still in connection with it, and for the very substantial reason that, under such circumstances, the pressure is not made directly against the womb itself—which must necessarily expose it to more or less injury—but the pressure, you perceive, is directed against the intervening object—the placenta. It may, however, be that the size of the after-birth will add so much to the volume of the tumor as to render the reduction physically impossible. In such case, of course, the proper alternative is the detachment of the placental mass. After the reduction has been accomplished, the hand is not to be suddenly withdrawn from the uterus, but, on the contrary, it should be continued within the cavity until the organ, through its contractions, forcibly expels it; this will be the best safeguard against the recurrence of the inversion. Should every effort fail—and such in the most skilful hands will not unfrequently be the case—care should be taken to return, if possible, the tumor within the vagina and sustain it *in situ* by the india-rubber pessary, or a piece of soft sponge, and, if necessary, with the addition, also, of a bandage.

It would seem that after the reduction of an inverted womb, the mortality is comparatively slight, for in fifty-two cases in which the organ was restored to its position, death occurred in seven only, or one in 7.3.

Spontaneous Reduction of the Inverted Uterus.—There are

* Great benefit will often be derived from the administration of ether, if there be nothing to contra-indicate its use; its relaxing effects will very much facilitate the reposition of the organ.

several cases reported of spontaneous restoration of the inverted uterus, after resisting every attempt at reduction. One of these occurred in the practice of the renowned Baudelocque, on whose authority it has found a place in the historical archives of the profession. I shall present it to you as recorded: Madame Bouchardat was delivered of her first child at Cape Francis, in 1782; at the time of the delivery of the placenta, effected by the hand introduced into the uterus, she complained of severe pain, and felt between her thighs the protrusion of a large tumor, which was immediately returned within the vagina. The lady became almost exsanguinated, and so prostrate that the attending accoucheur was apprehensive that, if he made any attempt to restore the organ, she would die in his hands. After seven or eight years of suffering, Madame B. visited Paris for the purpose of consulting Baudelocque. This distinguished accoucheur, after a thorough examination of the tumor, decided that it was an inverted uterus: he made several attempts to reduce it, but failed. He prescribed baths and rest. On the evening of the day preceding that appointed by Baudelocque for another attempt at reduction, Madame B. was urged by some of her friends to walk about her room. When doing so, she fell suddenly in a sitting position on the floor; she complained of an unusual movement in the lower portion of the abdomen, and, for an instant, lost her consciousness. Baudelocque being sent for, was soon at the house, and, on examination, could detect no tumor—it having spontaneously been restored. From this time, the patient improved in health. Having been a widow for several years, she married again, became pregnant, and was safely delivered at full term.

This case, remember, I give you solely upon the testimony of Baudelocque. With less weight of authority, I should be disposed to rank it among what may be termed *medical delusions*.

Extirpation of the Inverted Uterus.—When it is impossible to return the uterus, the inversion becomes chronic;* in this condition, it may or may not cause much inconvenience, and even involve the life of the patient in danger. For example, when it assumes the chronic form, the system may be gradually drained by the oozing, either of blood or mucus, which is so apt to accompany this stage of the displacement. Again, indolent and rebellious ulcerations, induced by the friction of the dress, may ensue, and

* There are some exceptional instances reported of chronic inversion of the uterus, in which the organ has been reduced after years of displacement. Among others, may be mentioned the remarkable case, which occurred in the practice of Prof. J. P. White; the organ had been inverted for fifteen years; it was successfully repositied. The patient died sixteen days subsequently of peritonitis. Dr. Tyler Smith reduced an inverted uterus of twelve years' duration; patient recovered. [For details of Prof. White's case, see Am. Jour. Med. Sci., July, 1858. p. 13. For Dr Smith's, Am. Jour. Med. Sci., July, 1858. p. 270.]

these ulcerations so far compromise the safety of the woman as to suggest the very delicate and important alternative—*extirpation of the inverted organ, as the only chance of safety*. In the whole range of obstetric medicine, I know of no more momentous question than this for the decision of the accoucheur; painful, indeed, is the responsibility of an operation, the very nature of which, to my mind, is horrid to contemplate; not so much because of the danger of the alternative, as that it absolutely unsexes the woman, and makes her existence one of irreparable sadness, more especially if she should not have passed the child-bearing period. I, therefore, think that the fullest and most undoubted evidence that, all things fairly and deliberately weighed with the single motive of arriving at the truth, the operation affords the only hope of safety—will alone justify a resort to it.

The following table, which I take from Dr. West,* gives the result in fifty cases of extirpation of the uterus for inversion connected with parturition. It will be seen that thirty-six of the cases were successful, twelve fatal, and in two instances, although the patients survived, it became necessary to abandon the operation. The total also shows the results of the respective modes of performing the operation—ligature and excision.

	Whole number of cases.	Recovered.	Died.	Operation abandoned.
Uterus removed by ligature in	38	28	8	2
" " " knife in	4	3	1	
" " " knife and ligature	8	5	3	
	<u>50</u>	<u>36</u>	<u>12</u>	<u>2</u>

The annexed table is interesting, as it indicates the influence of the period at which the extirpation is performed on its fatality :

	Patients recovered.	Died.	Total.
Under 1 month,	4	3	7
Between 1 and 2 months,	3		3
" 2 " 6 "	3	3	6
" 6 " 12 "	2	3	5
" 12 " 18 "	5		5
" 18 " 2 years,	1		1
" 2 " 3 "	4		4
" 3 " 4 "	2		2
" 4 " 5 "	4		4
" 5 " 6 "	2		2
" 6 " 7 "	2		2
After 12 years,	1		1
" 14 "		1	1
" 15 "		1	1
" many years,	2		2
	<u>35</u>	<u>11</u>	<u>46</u>

At the commencement of this lecture, I remarked that it was

* Lectures on Diseases of Women. 1858., p. 186.

more particularly in the walks of private practice that we are to look for the occurrence of inversion of the womb, and that it is, unhappily, too often the direct result of ignorance and wanton brutality. The following melancholy case will, I think, sustain me in this opinion; it occurred some years ago in this city, and became the subject of legal investigation; it, therefore, forms a part of the criminal calendar of New York. It is a dark picture in the affairs of professional life as occasionally exhibited in this metropolis, and, perhaps, such revelations would be more frequent, were it not that the grave, which receives the victim, too often buries within it the tale of woe which led to that victim's destruction!

A poor German woman was taken in labor, and sent for a Dr. Septimus Hunter, to minister to her wants. The child was delivered, but there was some delay in the expulsion of the placenta. It was proved by numerous witnesses, in the room at the time, that the doctor had made the most powerful efforts to bring away the after-birth, amid the heart-rending screams of the unfortunate patient, and the most fervent appeals both from her and the friends who surrounded her, that he would desist, and leave the poor sufferer to nature. It was also shown that, during these savage manipulations, the blood flowed profusely from the womb, so that there were, in the language of the witnesses, "big pieces like liver upon the floor." The doctor, intent upon the accomplishment of his purpose—the removal of the placenta—paid no sort of attention either to the agony of the patient, or the remonstrance of her friends, but continued his unholy work; his cruel efforts were in no way diminished, but the shrieks of the patient had ceased; she lay quiet, and without a murmur; bracing his feet against the bed, by one herculean grasp Dr. Septimus Hunter brought away, as he supposed, the placenta, but with it, he likewise tore from the body of that *dead woman—the womb!!!*

There was necessarily much excitement among the witnesses of that scene of blood; a police officer was sent for; Hunter was arrested; the coroner held his inquest—and the verdict of the jury was: "That the death of the woman was caused by the tearing out of the womb by Dr. Septimus Hunter." The uterus was preserved by the coroner; it proved to be a case of inversion of the organ, which this trafficker in innocent blood had mistaken for the after-birth, and thus coolly and deliberately wrenched it from her person! After the finding of the verdict by the coroner's jury, the case was submitted to the Grand Jury, who, after a full hearing of the evidence, brought an indictment of murder against Hunter. The trial excited much attention at the time, and the interest of the profession was especially elicited. Several medical gentlemen were examined, and there was a very general concurrence among them

that the death of the woman was occasioned by the tearing out of the womb!

It was my good or bad fortune—I cannot say which—to be called as a witness on the occasion; and I unhesitatingly gave it as my opinion that death was not the result of the tearing out of the womb, but that the woman died from flooding, and that she was dead before the man of blood had wrenched the uterus from her person! This opinion was regarded as a very singular one—it was at variance with the rest of the medical testimony, and subjected me to a searching cross-examination by the Hon. Mr. Whiting, who at that time held the office of District Attorney. The examination, able as it was, did not cause me to surrender, in the slightest detail, or compromise in any way the broad and emphatic opinion I had given under the solemnity of my oath, and, I hope, with a full appreciation of my duty to the commonwealth. Now, then, gentlemen, had I any basis for that opinion, and if so, what was it? 1st. It was proved by numerous witnesses—and their testimony was not contradicted—that while the doctor, in defiance of the shrieks of the patient, was engaged in his brutal work, there was profuse hemorrhage from the womb. This testimony was confirmed by the coroner and jury, who stated that when, soon after the death of the woman, they entered the room, they found the bed and carpet completely saturated with blood. 2d. It was also proved that, for some minutes before the doctor had brought away the uterus, the patient ceased to complain; she lay quiet, made no manifestation of suffering; and the moment the doctor had achieved his triumph, the friends, in ignorance of what had been done, supposing that all was right, spoke to the patient, told her it was all over—but the intelligence reached her not—*that woman was dead!*

It was, therefore, upon this testimony that I founded my opinion; for it is absurd to imagine, in the first place, that the woman, if alive, would not have continued to exhibit the intensity of her suffering during the butchery to which she was subjected; and, secondly, the quantity of blood lost sustains the hypothesis that she had expired before the completion of the horrid deed. It was attempted by the learned counsel for the prosecution to show that the bleeding was the result of the tearing out of the uterus, and that, therefore, the defendant was guilty of murder. On this point, too, I underwent a protracted examination, and all that legal acumen could accomplish, was brought to bear in the attempt to elicit from me an affirmative answer. But I also had a duty to perform, and that was to subserve justice as far as I was able to do so. My reply to the question was—that there were, in my opinion, two reasons why the hemorrhage could not be the result of the forcible pulling out of the uterus: 1st. The united testimony of all the witnesses, that the blood had escaped before the womb was

removed ; 2d. That *lacerated vessels do not, as a general rule, bleed.*

My testimony, I believe, had something to do with the verdict rendered by the jury in the criminal trial—instead of murder, Hunter was found guilty of manslaughter, and sentenced for twelve months on Blackwell's Island. It was my duty to testify to the truth, without reference to any collateral issue ; I did so ; at the same time, I am free to confess that if I had been governed simply by my feelings, and the award of punishment had been left to my discretion, I should have sent the man to the State Prison for life, in order that the bulky walls of that mansion might protect the community against a similar outrage.

LECTURE XXXI.

Preternatural Labor, divided into **Manual** and **Instrumental**—**Causes of Manual Labor**—**Malposition of the Fœtus**—How may the Fœtus be Malposed?—**Exhaustion**, how **Divided**—**Positive and Relative Exhaustion**—**Importance of the Distinction**—**Diagnosis of the two kinds of Exhaustion**—**Hernia**, as a cause of **Manual Labor**—**Prolapsion of the Umbilical Cord**; **Relative Frequency of**—**Extremely Destructive to the Child**, but not to the Mother—**Predisposing Causes of Prolapsion**—**Diagnosis of Prolapsion**—How is the Death of the Child occasioned in **Prolapsion**?—Is it the **Coagulation of the Blood in the Descended Portion of the Cord**?—Is the **Arrest of the Circulation in the Cord** a positive Proof of the Child's Death?—**Dr. Arneth, of Vienna**; his Cases—At what period of **Labor** does **Prolapsion** occur?—**Treatment of Prolapsion**; on what it depends—**Various Contrivances for Reposition of the Cord**; their **Value**—**Mode of replacing Cord in Vienna Hospital**—**Postural Treatment**, as recommended by **Dr. Thomas**. **Hemorrhage**, as a Cause of **Manual Labor**—**Placenta Prævia** and **Ante-partum Hemorrhage**—The Earlier Writers; their views of **Placenta Prævia**—**Connexion between Placenta Prævia and Hemorrhage**—**Unavoidable Hemorrhage**. **Placenta Prævia**; **Symptoms of**—**Diagnosis**—**Treatment of Placenta Prævia before and at the time of Labor**—The **Tampon**; when to be employed—**Benefits and Dangers of the Tampon**—**Version in Placenta Prævia**; **Rules for**—**Dr. Simpson** and **Entire Artificial Detachment of Placenta**; **Objections to**—**Dr. Barnes** and **Partial Artificial Detachment**.—**Ergot in Placenta Prævia**; **Abuse of**; when to be employed—**Rupture of the Membranous Sac in Placenta Prævia**; is it useful or otherwise?—**Accidental Hemorrhage**; how it differs from **Unavoidable Hemorrhage**—The **Pathology and Causes of Accidental Hemorrhage**—**Dr. Robert Lee**, and a **Short Cord** as a Cause—**Treatment of Accidental Hemorrhage during Pregnancy, and at the time of Labor**.

GENTLEMEN—We shall now discuss the interesting subject of **preternatural labor**, by which you are to understand that form of **parturition** in which nature is so far contravened in her arrangements, as to need the interposition of the accoucheur for the accomplishment of childbirth. **Preternatural labor**, we have already remarked, may be either **manual** or **instrumental**. In the former instance, the introduction of the hand becomes necessary for the termination of the delivery; while, in the latter, a resort to instruments is indispensable.

Manual Labor.—The causes of manual labor are numerous, and it is important that you should have a clear appreciation of them, in order that its indications may not be confounded with those of instrumental delivery. In the first place, you are to bear in mind that there are many complications, which may present themselves during the progress of labor, and which, therefore, may so far com-

promise the safety either of the mother or child as to call for the prompt interference of the accoucheur—the interference, however, being limited to the introduction of the hand with one of two objects: either to correct a malposition, and then commit the termination of the delivery to nature, or, if the necessity be urgent, to proceed at once to the accomplishment of the birth by version. It is too obvious to need argument that, when there is much disproportion between the fœtus and maternal organs, manual aid will be utterly inadequate to the requirements of the case; under these circumstances, a resort to instruments will be the only alternative. For how could you hope, by the simple introduction of the hand, either to enlarge a contracted pelvis, or diminish the size of a fœtus disproportioned to the passage through which it is to make its exit? In strict truth, the essential causes of manual labor will be found in the various malpositions of the fœtus, thus rendering an adjustment of the position absolutely necessary in order that the child may pass; but, at the same time, there are other complications to which we shall presently refer, which will call for artificial interposition; and there may, also, arise the question of alternative of choice between instrumental and manual delivery, the question of alternative being determined by the peculiar nature and exigencies of the case.

The fœtus may be said, so far as the possibility of natural delivery is concerned, to occupy a malposition when, instead of one of the extremities of the ovoid, some portion of the trunk presents at the superior strait; it is also badly situated if the head, in lieu of the vertex, should present its occipital or lateral regions, for, in this case, the disproportion would be such as to render it physically impossible for the head to pass without a previous change of position; and again, the same difficulty would occur in presentation of the breech, knees, or feet, if either of these portions should be so placed against any part of the upper strait as to become immovable, notwithstanding the contractions of the uterus. So you are to recollect that not only, in order that labor may be natural, is it required that one of the obstetric extremities of the child shall present, but it must present properly, and in accordance with the ability of the uterus to expel it. Besides the malpositions of the fœtus, there are various accidents, which may so far complicate the safety of either mother or child, as to convert a labor, which would otherwise be natural, into one of manual delivery, or at least into one in which it may become necessary to determine whether it would be more judicious to resort to instruments, or terminate the labor by the hand. These accidents are as follows: *exhaustion, hernia, prolapsion of the umbilical cord, hemorrhage, convulsions, multiple pregnancy.*

1. *Exhaustion.*—The young practitioner, whose experience in

the lying-in room has of course been limited, must be on his guard touching this word *exhaustion*; it is a very equivocal term; unless properly defined and thoroughly appreciated, it will oftentimes lead to erroneous decisions. In order that you may have a clear understanding of its true import, and of the indications it involves, I shall divide it into two forms—*relative and positive exhaustion*. For practical purposes, this is, I think, a sound and important division, and if a just distinction be made between these two grades of exhaustion at the bed-side, all possibility of embarrassment will be at an end.

Relative Exhaustion.—I have scarcely ever attended a case of labor, unless its duration was extremely brief, in which, during the throes of parturition, and more especially during the expulsive effort, the female did not exclaim, “*Oh! I am so weak, I shall die if I have another pain.*” This, or something kindred to it, is, I may say, the stereotyped language of the parturient woman. Now, gentlemen, if you give this phraseology a literal translation, if you take your patient at her word, you will at once conclude that a storm is gathering, and, in your anxiety to do something, you may be guilty of officiousness, which will be quite likely to compromise the safety of the woman and her child, and do no great credit either to your judgment or skill.

When you reflect, for a moment, on the severe sufferings occasioned by childbirth, and the commotion to which the nervous system is subjected during a forcing labor-pain, you can readily conceive why all this should beget a feeling of momentary prostration, causing the female to believe that the recurrence of another pain will utterly annihilate her! But how delusive this opinion of the patient, whose standard of danger is the amount of physical suffering she endures. Not so, however, with the enlightened accoucheur, whose duty it is to distinguish between fiction and reality, and to arrive at conclusions not from mere appearances, but from substantial facts as they may present themselves to him in the aggregate. The testimony of the patient, under the circumstances of which we speak, is the testimony simply of feeling, and not of judgment, and therefore it becomes useless as a guide for practice. As soon as the pain has passed over, the poor woman, who a moment before was admonishing every one about her that she was exhausted and would certainly die, not only becomes tranquil, but engages in conversation, and even will laugh with good heart at a merry jest, which the accoucheur of tact will know so well how to introduce for the purpose, as it were, of detaching her mind from herself, and giving it temporary occupation in some other channel. Again: the pulse is good, the countenance is not haggard, there is no evidence whatever of a dilapidated condition of the vital forces—in a word, the prostration of which the patient complained, and which

she supposed to be the harbinger of inevitable death, is but the flitting of the April cloud over the sun, causing for the instant a slight obscurity, in order that the glorious orb may become still more effulgent. This, gentlemen, is what I term relative exhaustion, and is entitled to no consideration whatever, so far as being an indication for interference on the part of the practitioner.

Positive Exhaustion.—Positive exhaustion, however, is altogether a different thing, and, except through opportune and skilful interference, will inevitably lead to death. Here there is no imagination, no fiction—all is a solemn, emphatic reality. The patient, after a pain, does not rally. The sunken countenance, flickering pulse, the cold and clammy perspiration, the pallor of the general surface, indicate with unerring certainty that the system is at a low ebb—that it is fast approaching utter dilapidation. There is no, or, if any, but a momentary response to stimulants. The forces will not react. In these cases, which fortunately may be regarded as rare, every successive pain has a direct tendency to increase the prostration, and if something be not promptly done to meet the emergency, the patient sinks. This something consists in delivering her without delay. Should the head of the child have passed through the mouth of the uterus, or be in the pelvic excavation, recourse should be had to the forceps. If, on the contrary, the head be still at the superior strait, and the mouth of the womb sufficiently dilated to permit the introduction of the hand, the alternative is version. The particular reasons for this choice will be fully stated when we speak of the indications and rules for turning.

Hernia.—If a woman in labor be affected with hernia, whether it should have pre-existed, or be the result of extreme uterine effort, it will equally need the attention of the accoucheur. For example, suppose a case of femoral hernia: each successive pain may so increase the protrusion, as to give rise to the apprehension of its becoming strangulated. This latter contingency would necessarily subject the life of the patient to more or less hazard. In all cases, therefore, of hernial protrusion, one of the first duties of the practitioner should be, if possible, to reduce it, and then, by judicious support, to prevent its return. If, however, the hernia become irreducible, and increase during the pains of labor so as to place in jeopardy the safety of the patient, common sense at once tells you that the broad indication is to proceed without delay to artificial delivery, according to the rule to which we have just referred under the head of positive exhaustion.

Prolapsion of the Umbilical Cord.—This a very serious complication of labor, not that it subjects the life of the mother to any hazard, for it in no way compromises her safety; but it is of extreme danger to the child.

Mortality and Frequency.—According to the statistical tables of

Dr. Churchill,* in 722 cases of prolapsion of the funis, 375 children were lost, or more than one half. Many of the cases, however, it must be remembered, are taken from the records of Hospital practice, and as a large number do not seek admission until some time after the occurrence, when the chance of a safe delivery is diminished, and some not until the cord has ceased to pulsate—it follows that this mortality cannot be regarded as a true exponent of the results of private practice. In 152,574 cases, prolapsion of the cord occurred 629 times, or about 1 in 218. You observe, therefore, from these tables two facts: 1. That prolapsion of the cord is happily not of very frequent occurrence. 2. That it is extremely fatal, proving destructive to the child in more than one half of the cases.

Causes.—There are certain causes, which strongly predispose to this accident, and may be enumerated as follows: a pelvis, which is preternaturally enlarged; the insertion of the placenta near the mouth of the uterus; a cord, which is longer than ordinary; the sudden escape of the liquor amnii, especially when this latter is in unusual quantity; a shoulder, foot, or breech presentation, thus affording more space for the prolapse of the funis, and because, also, in these latter presentations the fetal extremity of the cord is nearer the inferior portion of the uterus; a contracted brim, preventing the descent of the head, and consequently predisposing the cord to pass into the vagina. To these may be added obliquities of the uterus, the tendency of which would be to incline the presenting portion of the fetus toward one or other of the borders rather than toward the centre of the superior strait, which would necessarily from the increased space predispose to a descent of the cord. Prolapsion of the funis is more frequent in women who have borne several children than in the primipara, and this arises from the fact that, in the former, the uterine walls have measurably lost their tenacity, and are more relaxed, and, therefore, facilitate the prolapsion. The above are some of the more prominent causes, which favor this complication.

Diagnosis.—The diagnosis is not difficult, and may occasionally be determined before the rupture of the bag of waters, although, as a general rule, it is more readily arrived at after the escape of the liquor amnii. In the former instance, the cord may be felt, during the interval of the uterine contraction, through the membranes, and the fact that what you feel is the cord may be ascertained by the important and characteristic circumstance that the pulsations are not synchronous or in accordance with those of the maternal heart, but are much more rapid.† Consequently, this

* Churchill's Midwifery, 4th London Edition, p. 454.

† Scanzoni notes an interesting circumstance which, without an explanation, might lead to incorrect diagnosis, viz. that the umbilical arteries, before entering the cord, may pass for a greater or less distance along the membranes—*insertio funiculi*

will demonstrate very unequivocally that the beatings, if any be felt, are not connected with the arterial system of the mother. The same rule will enable you to distinguish between the pulsations of the umbilical arteries, and those ramifying on the lower portion of the uterus. After the rupture of the membranous sac, the loop or fold of the prolapsed funis can be distinctly recognized by the touch, and, therefore, all doubt as to the nature of the difficulty will be removed.

Cause of Death in Prolapsion of the Cord.—What is it that causes the death of the child in prolapsion of the funis? This is a question about which there has existed a difference of opinion. Some have supposed that it was in consequence of the blood becoming coagulated in the descended portion of the cord; but it is now very generally conceded that death ensues from the compression exercised upon the funis, thus interrupting the circulation between the mother and child. One moment, if you please, upon this point of compression, and arrest of the circulation. You are not hastily to conclude, because the circulation is arrested, that, therefore, the child must necessarily be destroyed. It will sometimes happen that no pulsations can be detected in the cord for several minutes; the labor may advance, and by a change of position in the presenting portion of the fœtus, the compression will be removed, and the circulation re-established. It is well, therefore, to remember that compression of the cord, with an absence of pulsation, does not, as an inevitable consequence, imply that there are no longer any throes of the fœtal heart. Dr. Arneth, of Vienna, mentions four cases under his notice, in which no pulsations had been detected in the cord for half an hour previous to delivery, and in each instance the child was born living.

From what has been already stated touching the fatality of this complication to the child, it will become a paramount duty, in all cases of funis protrusion, at once to announce, not to the patient herself, but to her husband or some other relative, the apprehensions you experience as to the safety of the fœtus. In doing this, you will have done nothing more than your duty; and whether the child be saved or perish, you will have liberated yourselves from all responsibility, which concealment of the fact would have imposed. Frankness is an essential and very necessary element in the character of a medical man; and while the object of his profession is to save human life, and palliate human suffering, yet it is equally incumbent upon him, when he finds himself surrounded by dangers placing in imminent peril the safety of his patient, candidly to disclose to those most interested in the issue of the case his doubts and fears.

umbilicalis velamentosa—so that their pulsations may be felt, and yet the cord not be prolapsed.

At what Period of Labor is Prolapsion most likely to Occur?—

Prolapsion of the cord may occur at any period of labor—before the os uteri is much dilated, after it is fully dilated, or before and after the escape of the liquor amnii. The tendency of its descent, however, is greater after the rupture of the membranous sac, and this circumstance, therefore, is an additional motive why great caution should be exercised not prematurely to interfere with the integrity of the bag of waters.

Treatment of a Prolapsed Funis.—What is to be done in cases in which the cord is prolapsed? This is an interesting interrogatory, and is worthy of consideration. If you imagine that the mere prolapsion of the umbilical cord is an indication for interference on the part of the accoucheur, you will labor under serious error, and be quite likely, with this view of the subject, oftentimes to do mischief. There are three conditions in which this accident may present itself, each varying from the other, and requiring a different kind of management:

1. There may be no pulsations, and, at the same time, irresistible evidences of the death of the fœtus from incipient decomposition of the cord.
2. The pulsations may continue strong and vigorous, showing that there is as yet no undue compression.
3. The pulsations, from being strong and vigorous, may become more and more weak, indicating that the pressure exercised upon the cord is endangering the circulation between the placenta and fœtus.

If you will bear in mind these three conditions, and give full appreciation to each one of them, your duties in this form of complication will not only be simplified, but what is very important they will be well defined. In the first place, therefore, if no pulsations be detected, and there be palpable evidence that decomposition of the cord has commenced, then the proof is positive that the child is dead. Under these circumstances, it would be unnecessary for the accoucheur to interfere; on the contrary, the labor, all other things being equal, should be confined to the efforts of nature, for you have already been told that, in funis presentations, the only danger is to the child, the safety of the mother being in no way involved. Surely then, the important fact being ascertained—the death of the child—it would not only be uncalled for, but altogether unjustifiable to have recourse to artificial delivery, unless there be some circumstance, other than the prolapsion of the cord, rendering interposition necessary. Secondly, as long as the pulsations in the cord are strong and vigorous, there is no indication of peril to the child, for the reason that the true element of danger consists in the interruption of the circulation through compression. While, then, the force of the pulsations is natural, it is

manifest that there is no undue compression; therefore, it is unnecessary to do more than merely place the cord—if it should have fallen beyond the vulva—high up in the vagina, for the purpose of protecting it from exposure to the atmosphere. The third condition, however, presents different indications, and something must be attempted to prevent the effects of the compression, which are shown by the fact that the pulsations lose their ordinary force, and become more and more weak. Here, if the compression continue, there is very serious hazard to the child, and now the question arises—What, under the circumstances, is to be done?

Much has been said about the reposition of the prolapsed funis, and, with a view to accomplish this object, numerous instruments have been constructed. I have very little confidence in any of these contrivances. They may sometimes succeed in dexterous hands, but very frequently they fail; and, more than this, the very attempt made to replace the fallen cord is oftentimes followed by injury, not only to the cord itself, but to the adjacent soft parts. It is amusing to hear some persons talk of the facility with which the reposition of the funis can be effected by the aid of these contrivances. But, gentlemen, it is one thing to talk, and quite another thing to act. I have known many a plausible theory to give way and prove utterly negative, when tested at the bedside of the patient. The very best instrument, in my opinion, for replacing the cord, is the fingers of the accoucheur. Let the middle and index fingers be gently introduced within the vagina; they are thus brought in contact with the fold of the cord; this latter should be directed toward one of the lateral and posterior points of the pelvis—most frequently toward the left sacro-iliac symphysis, for the reason that at this point there is usually more space, in consequence of the greater frequency of the first vertex position of the head. In this way it is sometimes possible to replace the cord within the uterus, and thus remove the compression to which it has been subjected. If this can be done, much good will have been accomplished, and the labor may then be committed to the resources of nature. It must be recollected that the attempt to replace the cord should be made only when the os uteri is well dilated, the head or presenting portion of the fœtus at the superior strait, and not after it has passed into the pelvic excavation. In this latter case, we have a more efficient and prompt remedy in the immediate delivery of the child by the forceps.*

* I should not omit to mention an ingenious plan, suggested by Dr. T. Gaillard Thomas, for the reposition of the cord. It consists essentially in what he terms *postural treatment*. The woman, in case of funis prolapsion, "is placed on her knees, with the head down upon the bed." Dr. Thomas observes "that the causes of this accident (prolapsion of the cord) reduce themselves to two, the slippery nature of the displaced part, and the inclined plane offered it by the uterus, by

According to Dr. Arneth, the funis is always replaced in the Vienna Lying-in Hospital when the operation is practicable. The plan adopted, when the head presents, and is movable at the brim, the os uteri being fully dilated, is to push the funis upward, and lay it in the hollow of the neck of the child. There are forty-three cases recorded in the hospital register of this reposition, and in thirty-eight the children were born alive; in three of the remainder, the cord was almost pulseless when returned; in one instance, the forceps was resorted to in consequence of inertia of the uterus.

But suppose the reposition of the funis cannot be brought about, are we then to do nothing? To remain satisfied with the failure to replace the cord, and to consider the abortive attempt as the full measure of your duty, when the evidences of compression are beyond all peradventure, would be to consign the child to great peril, if not to certain death. Such conduct would not only be highly reprehensible, but would very properly subject you to merited rebuke, *unless you had a good and justifiable reason for non-interference*. There are two alternatives to which recourse may be had in a contingency of this kind—version and delivery by the forceps.

It is extraordinary that there should exist among writers on midwifery such diverse opinions touching the propriety of these two alternatives; and it is equally unfortunate for the young accoucheur that these opinions should be recorded in the books, which are supposed to contain correct rules of practice, and, therefore, regarded safe guides in the hour of doubt and embarrassment. One author, for example, inculcates the necessity of proceeding at once to the termination of the delivery by *version* “if the child be living, and the presenting part remain high up in the pelvis.” The language just quoted is that of Denman, whose name deservedly carries with it great weight. No less an authority on the general question of obstetrics, Dr. Dewees, of whom our country has reason to be proud, holds that “Turning may be had recourse to, if the uterus be sufficiently dilated or dilatable for the operation, the head being still inclosed within the uterus, and there is no deformity of the pelvis.” I might array before you the names of other distinguished men in favor of the operation of turning, as a conservative measure in prolapsion of the cord. But to do so, would, I apprehend, be of little moment. It is more important, I think, to examine, for the instant, the universal propriety of the rule inculcated.

which to roll out of its cavity; and, second, that the only rational mode of treatment would be in inverting this plane, and thus turning to our advantage not only it, but the lubricity of the cord, which ordinarily constitutes the main barrier to our success. [Transactions New York Academy of Medicine, Vol. II., Part II.]

The ostensible and only justifiable argument in favor of version in cases such as are now under consideration, *is that it will afford the child the best means of safety.* But while, on the other hand, we are prompted to do so much for the child, we are not to forget that the safety of the mother has claims equally urgent, which cannot be lightly regarded by the accoucheur. How often is the life of the mother involved in peril in the operation of version, and how often, alas, does this peril terminate in her death! You see, therefore, that in selecting the alternative you must be governed not by the abstract fact that the funis is prolapsed, but by a due consideration of all the surrounding circumstances. You are to consider whether, in full view of all the facts of the case, *turning* presents the greatest promise of safety to the child, without compromising the life of the parent.

If my own opinion be worth anything on this question, I should advise you, no matter how imminent may be the danger to the child, never to have recourse to version, except under the following conditions: 1. The head at the superior strait not having descended into the pelvic excavation; 2. The mouth of the uterus soft and dilatable, readily permitting the introduction of the hand; 3. The pains must not be characterized by great vigor, for this would not only be a serious obstacle to the introduction of the hand, but would prove a substantial ground why version should not be attempted, for the reason that efficient and regular contractions would be likely to terminate the delivery more rapidly than it could be done by turning; 4. There should be no pelvic deformity, or, at all events, very slight. It must also be borne in memory, that, in version, the child is not unfrequently sacrificed, and oftentimes its death is traceable purely to compression of the cord during the manipulations, necessary to the accomplishment of the operation. If the head should have passed into the pelvic cavity, and more especially if it should have reached the inferior strait, then the indication would obviously be to deliver without delay by the forceps, care being taken so to adjust the instrument as not to make pressure on the cord.

Hæmorrhage.—Hæmorrhage or flooding before the birth of the child, will constitute, under certain circumstances, an important cause of artificial delivery. Your attention has already been directed to hæmorrhage after the birth of the fœtus; we shall now speak of this accident as it sometimes presents itself previously to the expulsion of the child. As associated, therefore, with the question of ante-partum flooding, we shall proceed to consider that form of it, which is more or less directly connected with placenta prævia. By the term placenta prævia, you are to understand the insertion of the after-birth either completely or partially over the neck of the womb.

The almost necessary connexion between this attachment of the placental mass and hemorrhage will be pointed out immediately. The earlier writers promulgated some singular views in explanation of the reason why the placenta is occasionally found implanted over the cervix uteri. Some of them maintained that this was not the point of its original attachment, but that when found over the os uteri, it was the result simply of separation from its former place of insertion, and the consequent gravitation of the mass toward the neck of the organ. You are to remember, however, that this hypothesis, absurd as it is, was the offspring of those times in which physiology was scarcely in possession of a name, and when, consequently, our present advanced knowledge of embryonic development was one great blank. But even with our present knowledge, there is not a general concurrence of sentiment as to the true cause of placenta prævia. I am very much inclined to the opinion, however, recently suggested, that it is owing to the fact of the fecundation of the ovule after it has passed from the upper to the lower portion of the uterus to the immediate vicinity of the os uteri. This explanation at least possesses the merit of plausibility, and is due, I believe, to Dr. Tyler Smith.

I have just told you that the placenta may be attached to the neck of the uterus either completely or partially. In the former instance, the after-birth may be said to rest, centre for centre, over the dependent part of the organ; while, in the latter, only a portion of its border is found there. But what is essential for you to remember is, that, in either case, there will be, as a general rule, more or less hemorrhage. Indeed, were it not for the flooding attendant upon this form of presentation, placenta prævia would be altogether without interest. It is, therefore, because of the serious danger in which both mother and child are involved from losses of blood in placental presentation, that it becomes a question entitled to your fullest consideration.

I have endeavored, when discussing that subject, to portray to you the imminent peril of the lying-in woman in hemorrhage after the birth of the child; and now you will permit me to assure you that, kindred to that peril, is the hazard which life encounters from the hemorrhage consequent upon placenta prævia; nor must it be forgotten that the danger is more momentous in the latter case, from the circumstance that here, in addition to the safety of the mother, the life of the child becomes seriously involved.

Is there a necessary connexion between placenta prævia and losses of blood, and if so, what is that connexion? This is an exceedingly interesting question for the young accoucheur, and its solution will at once point out to him, not only the true danger of this form of presentation, but it will also demonstrate beyond a peradventure the urgent necessity of unbroken vigilance in these

cases, so trying to the interests of both mother and child, and at the same time so harassing to the practitioner.

Well, there is a connexion, and it is simply this: the direct cause of the hemorrhage is the rupture of one or more of the utero-placental vessels, in consequence of the widening or dilatation of the uterine extremity or internal orifice of the cervix. You will remember, when speaking of the gradual development of the uterus, under the influence of gestation, your attention was specially directed to the important fact, that, for the first five months, the accommodation of the growing embryo is provided for exclusively by the increased capacity of the fundus and body of the gravid womb; and it is not until after the fifth month that the cervix of the organ begins, through a process of shortening, to contribute its proportion of space to the wants of the fœtus. If this be really so, and I think there is no doubt of the fact, you will at once perceive how irresistibly, as a general rule, there is deduced from the recollection of this circumstance a most important practical principle in connexion with the question now under consideration.

The principle to which I allude is this: that in *placenta prævia*, the hemorrhage may commence, not necessarily at the time of labor, but at the sixth month, and may continue at intervals in more or less quantity, until the completion of the delivery at the full term. Contrary to the opinion of Stoltz, Cazeaux, Dr. Matthews Duncan, and others, I have endeavored to show you that the shortening of the neck of the uterus in pregnancy commences at its uterine, and not at its vaginal extremity. As soon, therefore, as this shortening commences, it will generally, to a greater or less extent, be at the expense of the integrity of some of the utero-placental vessels, which, in *placenta prævia*, constitute an important connexion between the upper portion of the cervix and maternal surface of the placental mass. I say *generally*, and it is, in a practical point of view, and more particularly as regards a correct diagnosis, important that you should bear the word in memory, for you will sometimes meet with exceptional cases in which, in *placenta prævia*, there is no sign of hemorrhage until the commencement of labor at the full term of utero-gestation.

When, however, the bleeding commences at any period between the sixth and end of the ninth month, it is well to recollect that there is nothing fixed or regular in its recurrence. It will sometimes be slight, again copious, and may return at an interval of a few days; nor is it announced by any premonitory symptoms, its advent being more or less sudden. In some cases, too, strange to say, through a salutary clot, and the closing of the exposed utero-placental vessels, the woman will pass on to the completion of her pregnancy without the interposition of science. But these are extremely rare instances, and should in no way be relied upon as a reason for inaction on the

part of the accoucheur. On the contrary, it will be his imperative duty, as we shall state under the head of treatment, promptly to interpose as soon as he becomes aware of the hemorrhage, no matter how slight it may be at its inception. The bleeding in cases of *placenta prævia* has not been improperly termed *unavoidable*, in contradistinction to another form of hemorrhage during gestation, designated *accidental*. In the latter instance, the loss of blood is due to a sudden and partial separation of the placenta, when situated in other portions of the uterus than over the cervix, and the separation is traceable mainly to falls, shocks, mental emotions, or sudden congestions. This accidental hemorrhage may arise, also, from rupture of one or more vessels of the umbilical cord. There is one point essential to note in connection with *placenta prævia*, more particularly when the after-birth rests, centre for centre, over the cervix uteri, and the point to which I allude is this: *the hemorrhage is more profuse at the time of labor than if it should occur previously to the full term of gestation, for the reason that the effect of a labor-pain is to detach from the cervix a portion of the placental mass, and consequently expose a larger surface of the utero-placental vessels; and these utero-placental vessels, it must be remembered, have, at the completion of gestation, attained their maximum of development; and, in this latter fact also, will be seen an additional reason for the greater profuseness of the flooding at the period of ordinary parturition.*

It will sometimes happen that the placenta, through the spontaneous efforts of nature, will be expelled previously to the child; in this case, the head of the fœtus, responsive to the contractions of the womb, may act as a wedge against the bleeding surface of the cervix, and thus most opportunely arrest the hemorrhage. Again: if a woman have an extraordinarily capacious pelvis, and the contractions be marked by great vigor, the entire ovum—child, placenta, and membranes—may be suddenly thrown from the uterus, and in this case, too, if the vacated organ contract promptly there will be no flooding. These, however, it is to be recollected, are instances contrary to the general rule. But as they have, and will again occur, it is incumbent to bear them in memory. When the expulsion of the after-birth is preceded by that of the child, it is important to recollect that this is the result altogether of the strong contractions of the uterus, which, in the first place, have been sufficient to detach the placental mass, and, secondly, to throw it into the world. In these instances, if one of the extremities of the ovoid should present, the delivery is usually accomplished without delay, and the case terminates auspiciously, for the simple reason that the separation of the placenta and the subsequent part of the labor has been effected in accordance with the natural effort. Malpositions of the fœtus, however, are not at all infrequent in *placenta prævia*,

and this should be remembered, in order that when they do occur their recognition may be prompt. This form of presentation necessarily enhances the danger to both mother and child.

Symptoms.—If a pregnant female have hemorrhage from the uterus, at any time between the sixth and ninth month of gestation, and on investigation it be ascertained that there is no external cause for the bleeding, and if the blood flow in sudden gushes at intervals, even during the quietude of sleep, then the apprehension may arise that the hemorrhage is due to placenta prævia. If the hemorrhage occur at the time of full parturition, and there be an absence of any of the causes of accidental bleeding, and if the discharge of blood become more profuse as the labor-throes advance, it is valuable presumptive evidence that the placenta is over the mouth of the uterus.

Diagnosis.—In order that all uncertainty may be at an end, and the question of placenta prævia placed beyond a doubt, it is well to recollect that there is one means by which the accoucheur can arrive with full truth at an accurate diagnosis;* and this consists in the fact that, if the *os uteri* be dilated sufficiently to admit the introduction of the finger, he can feel quite distinctly the placenta resting over it. The contact of the finger with this mass will impart a soft, doughy sensation. It is possible, however, without due caution, to mistake for the after-birth a clot or coagulum of blood. If it be the latter, it will be found movable, and may be readily brought away by the finger. There will, occasionally, exist around the *os uteri* vegetations, either syphilitic or cancerous, and these, too, may through inattention be confounded with the placenta. This latter body may also sometimes be recognized by the finger through the parietes of the cervix, even when there is no dilatation; but to accomplish this will require great nicety of touch, and a large experience in explorations of this kind. It is well, also, to recollect that, in placenta prævia, the vessels of the vagina become greatly engorged, sympathizing in this respect with those of the lower segment of the uterus, and these arterial pulsations are marked by increased force.

Treatment.—The most important and interesting circumstance connected with *placenta prævia* is unquestionably its management;

* According to statistical compilations from the journal of the Clinical Hospital, at Breslau, made by Dr. Von Glisczynski, (Med. Centr. Zig.; Schmidt's Jahrb., 102, 5,) placenta prævia occurs not quite as frequently as stated by others, only ninety cases having been there observed in 10,440 deliveries. The first indication is furnished by hemorrhage, during the latter third of pregnancy; sometimes as early as the fourth or fifth month. A certain diagnosis is not possible until the placenta itself can be felt. The fact that this abnormality occurs almost exclusively in *multipara* leads to the hypothesis of defective reorganization of the womb, either from several pregnancies following each other in too short a time, or from inflammatory and other morbid conditions of the same.

for although the fatality of these cases is comparatively great both to mother and child, yet, through prompt and judicious treatment, it may be much diminished.* You may be called to a case of this kind at any period before the completion of gestation, or at the time of labor, when the term of pregnancy has been accomplished, and parturition regularly commenced. We will suppose, in the first instance, the former case. The female may have reached the sixth, seventh, or eighth month; she discovers that she is losing blood from the vagina; it increases from day to day, and, in her anxiety, she sends for one of you.

What, under the circumstances, are you to do? The first inquiry, which would naturally suggest itself to the mind of an intelligent physician, would be—What is the cause of the bleeding? Is it the result simply of a threatened premature delivery? Is it occasioned by some sudden shock or injury, thus presenting an example of *accidental* hemorrhage? or is it traceable to the fact that the placenta is inserted over the neck of the uterus? These are the questions to be determined, and on their solution will depend the special treatment indicated. If you be of opinion—judging from the antecedent as well as the accompanying circumstances of the case—that the bleeding is due to *placenta prævia*, then I would suggest to you to pursue the following course: the patient should be placed on her back, with the hips slightly elevated; she should repose, not on a feather bed, but on a hard mattress; the room, if in winter, not to be above a medium temperature; if in summer, the windows and doors should be opened, in order that a pure and refreshing current of air may be promoted.

It is most important to guard the patient against all excitement, whether of body or mind. If fear should have seized her, and the nervous system become in consequence much disturbed, one of the best medicines, under the circumstances, will be the comforting assurance of her medical man that he will carry her safely through her tribulation. How often is it in the power of the accomplished physician by a dexterous use of the influence he possesses over his patient, to

* Dr. Schwarz, having examined the official returns made by Hesse Cassel practitioners, states that during a period of 20 years, 519,328 births were reported by 150 accoucheurs, and among them 332 cases of placenta prævia, or 1 in 1564 labors: the numbers varying from 8 to 28 per annum. The mortality depends upon the degree of the presentations of the placenta, and also upon the mode of treatment; of the 332 cases reported by the Hesse practitioners, 86 died, or 1 in 3·86. These, it must be remembered, embraced every variety of the accident, partial and complete. This corroborates in a remarkable manner the statistics of Prof. Simpson, who shows from data furnished by lying-in hospitals and practitioners of large experience that the general mortality of the accident is 1 in 3·6, and also, with the mortality of cases enumerated by Prof. Trask (Prize essay on placenta prævia, Transactions American Medical Association, 1855), which was, 237 deaths in 938 cases, or 1 in 3·95. The mortality after turning, according to Prof. Simpson, is 1·44 in 421 cases or 1 in 2·9; that afforded by Prof. Trask's record is 1 in 3·4.

fortify a perturbed spirit, and reanimate a drooping heart! It is highly necessary that constipation should be guarded against, for the very act of straining in the effort at defecation will have a tendency to increase the bleeding. Under the circumstances, should a movement be indicated, I should greatly prefer to enemata, the following solution, a tablespoonful of which may be taken once in two hours, until an aperient action is produced:

R
Sulphat. magnesiae $\bar{\text{z}}$ i.
Infus. fol. Rosar. f. $\bar{\text{z}}$ viij.
Ft. sol.

This is a combination, which I have employed with signal advantage in cases such as we are now considering. The patient should be restricted to cold drinks, nothing better, if it agree with the stomach, than iced lemonade. The diet bland and unstimulating. After the bowels have been gently acted on, I have recently experienced in two cases, in which the hemorrhage occurred at the sixth and seventh months respectively of gestation, decided benefit from the administration of the sulphate of the peroxyde of iron, the hæmostatic properties of which are now well established; from five to fifteen drops, three times a day, in a wine-glass of cold water. To prevent injury to the teeth it should be taken through a glass-tube. One point you are not to neglect—when the bowels are to be moved, or the urine evacuated, a bed-pan must be employed. On no account is the patient to be permitted to use the chair; the very effort may be followed by serious trouble in consequence of increased hemorrhage. Well, these are the preliminary measures to be adopted; but suppose the bleeding, notwithstanding these measures, should continue, and so profusely as to affect the strength of the patient, and involve apprehensions as to the general issue. Then, in addition to what has already been suggested, it will be proper for you to institute a careful vaginal examination with a view of ascertaining the condition of the os uteri, *which will either be sufficiently dilated to enable you to accomplish delivery, or it will not be so dilated.* In the latter case, the bleeding continuing in exhausting profuseness, and the os uteri not at all or but slightly dilated, you have an important remedy in the tampon.

I cannot understand why some clever and practical authors are opposed to the employment of the tampon in an emergency of this kind, for the arguments they urge are certainly, in my judgment, without the slightest basis. As a principal objection, they maintain that this instrument will be likely to produce internal hemorrhage, and thus destroy the patient. Those who raise this objection do so, I think, without sufficient thought, for it is quite evident that although internal flooding might possibly follow the employment of

the tampon in *accidental* hemorrhage, yet there is no ground for apprehension that it will ensue in placenta prævia, for the reason that the *bleeding surface is below, and the blood does not accumulate within the cavity of the uterus, but collects between the tampon and that portion of the cervix from which the placenta has, in part or totally, become detached.* So far, therefore, from this agent proving injurious, I regard it as one of the most efficient alternatives to which, under the circumstances, the accoucheur can have recourse. The very principle, too, on which the tampon exercises a salutary influence is one, which is directly opposed to the occurrence of internal hemorrhage; for, by a uniform and gentle pressure, it causes a coagulum which acts for the time as a check to further loss of blood. Thus, you see, you possess in this agent an admirable temporary remedy. If the os uteri be undilated, and the bleeding continue profusely, the patient must of necessity sink unless there can be something to hold it in check. For this purpose, I repeat, my great faith is in the tampon, or plug, as it is sometimes called. Now, an important question arises—How long is the plug to be employed? My answer is until the os uteri is sufficiently dilated to enable you to introduce the hand, turn, and deliver.

Version I hold to be the cardinal remedy in placenta prævia, if the head of the fœtus be still at the superior strait, and the mouth of the womb will allow the introduction of the hand; on the contrary, if it should have descended into the pelvic excavation, the indication is at once to resort to the forceps. But how are you to know—if you employ the tampon—that the os uteri has undergone dilatation sufficient to justify artificial delivery? This fact can only be ascertained by occasionally removing the tampon, and making a digital examination; the time as well as the necessity for doing this should be regulated by the frequency and character of the pains. There is an additional advantage in the employment of the plug, and it is this—its very pressure against the lips of the uterus will excite action of the organ, and thus promote contractions which, of course, will tend to hasten the opening of the os, an object so desirable in cases such as we are now discussing.

The tampon may consist of small pieces of old linen, or fine sponge, or what is still better, if at hand, carded cotton-wool—and they should be gently introduced into the vagina, piece after piece, until the entire passage is filled—the whole to be retained in place by means of a T bandage. There are several modes of introducing the plug. I adopt the following: the index finger of one hand being introduced into the vagina, the palmar surface upward, I seize with an ordinary calculus forceps a small piece of the material to be employed, and direct it along the finger as far as the os uteri, against which I exert slight pressure; and so succeeding pieces are introduced until the canal is quite filled up.

When necessary, they are to be removed, and replaced by other pieces.

An efficient tampon will be the india-rubber bag, filled with ice-water (the colpeurynter).

Let us now suppose that, on withdrawing the plug, it should be ascertained that the mouth of the womb is soft and dilatable, permitting the introduction of the hand without the fear of violence; how are you to proceed with the delivery?

I recommend, in case you should undertake the version of the fœtus, to proceed as follows: Carry your hand cautiously through the vagina to the mouth of the uterus—here, of course, you come in contact with the placenta, which is resting, more or less, over this portion of the organ. In a word, it occludes the opening through which your hand is to enter the uterine cavity. Make a slight circuit with your finger around the dilated os, and if you can find a portion of the placental surface which has become detached from the cervix, then, without hesitation, select this as the point of entrance, and immediately introduce the hand for the purpose of bringing down the feet. But, on the contrary, if you cannot detect the point at which the detachment has occurred, then my advice to you is at once to carry the hand immediately through the body of the placenta;* having thus gained admission into the cavity of the uterus, seek for the feet, bring them down, and thus terminate the delivery. What is there objectionable in this practice? You must remember, in the first place, that two lives are in serious peril—*time here is everything*, and the sooner the delivery is accomplished, the greater will be the chances of safety to both mother and child. If, therefore, by prompt and successful extraction of the fœtus, you cause the uterus to contract—and this, under ordinary circumstances, will be the natural result—have you not, by thus efficiently closing the mouths of the utero-placental vessels, achieved the very object most essential to the safety of mother and child—the *permanent arrest of the hemorrhage*?

As I have already stated, the true and only danger of placenta prævia is in the losses of blood it occasions. Therefore, is it not the part of wisdom, the moment the opportunity occurs, to do that very thing which, under the contingency, is most likely to accomplish the greatest amount of good—the *prompt withdrawal of the fœtus from the uterine cavity*? I think so, and it is for this sub-

* I am aware that in this advice I differ with most of the standard authorities; but I am quite sure I am right. The objections urged by them to the practice inculcated are two-fold: 1st, The difficulty of penetrating the placenta; 2d, The increased risk to the child from lacerations of this body. In reply to the first objection, I need only say that I have encountered very little difficulty in penetrating the mass; and to the second, I would simply remark that the child is exposed to the most imminent peril by delay, and the best alternative in these cases is immediate delivery.

stantial reason that I commend the practice just alluded to. With a due degree of caution, the well-instructed accoucheur, as soon as he has seized the feet of the child, and during the progress of his tractions, will be enabled to guard against inertia of the uterus, and having accomplished the delivery of the fœtus, he will, through proper attention to his duties, have the gratification of finding the source of the hemorrhage arrested by the proper contraction of the organ. But suppose you deem it necessary to thrust your hand through the placenta, or you should be enabled to detect a portion of its border separated from the cervix, and select this as the point of entrance into the uterine cavity, in either case the interesting question arises—What are you to do with the placenta? My advice is—to pay no sort of attention to it; bring down the feet, deliver the child, and then, if the expulsion of the after-birth should not promptly follow, carry up the hand and bring it away.

Artificial Detachment of the Placenta.—It is proper that I should here allude to the plan of artificial detachment of the placenta, suggested by Dr. Simpson. This eminent practitioner, in cases in which turning cannot be had recourse to, inculcates the practice of separating the after-birth from its surrounding attachments; and he seems to have been led to this mode of procedure from contrasting the diminished mortality in cases in which the placenta was spontaneously detached and expelled previously to the birth of the child—it being much less than under the operation of version. It does seem to me that Prof. Simpson, in his estimate of artificial separation, has not taken sufficiently into view the wide difference between *spontaneous* and artificial detachment. The former is the work of nature—the act she accomplishes through the force of uterine contraction, and it is, also, through these very contractions that the mass, after being spontaneously detached, is in the same manner expelled. It is not strange, therefore, that, under these circumstances, this spontaneous effort of nature should prove an admirable hæmostatic adjuvant in the profuse bleeding of placenta prævia. Does not the very same thing occur in ordinary labor, so far as the separation of the after-birth is concerned? Pray, how is this mass detached, no matter where it may be situated within the uterine cavity, except through the successive contractions of the organ?—And do not these very contractions, because they are in perfect consonance with the mechanism of nature, guard the parturient woman against an attack of hemorrhage? But suppose, with a view of illustrating this point more fully, the accoucheur, after the birth of the child, should attempt, by premature and forced tractions on the umbilical cord, to hurry the operations of nature, and thereby cause an artificial detachment; would there not, as a necessary consequence, in ninety-five cases out of one hundred, be more or less profuse bleeding? Un-

doubtedly such would be the result, and there is, in my judgment, a striking analogy between the two instances.

Prof. Simpson is also of opinion that the detached portion of the placenta constitutes almost exclusively the bleeding surface, and it is mainly on this hypothesis that is founded the practice he recommends; but if he be right in this conjecture, how are we to explain the occurrence of profuse *post-partum* hemorrhage after the placenta has been expelled? Will it be argued that, in placenta prævia, we have one kind of bleeding surface, and in hemorrhage after the expulsion of the after-birth, another? The great bleeding-surface, as I have already told you, consists essentially of the utero-placental vessels, and is, therefore, strictly uterine, and not placental; at least it seems to me that this is the main source of the hemorrhage the quantity of blood passing from the separated portion of the after-birth being quite insignificant. The view that the hemorrhage is derived almost entirely from the detached portion of the placenta, and not from the utero-placental vessels, was also maintained by the late Professor Hamilton, of Edinburgh.* It is proper, however, to remark, that the opinions with regard to the source of the hemorrhage in placenta prævia are conflicting, although the general belief is that it is derived from the uterus. Without mentioning other authorities, it may be well to state that Dr. Robert Lee, of London, is one of the sturdiest advocates of the doctrine that the blood proceeds from the uterine sinuses, while Dr. Radford, of Manchester, believes that it comes both from the placenta and uterus, although the larger quantity is furnished by the latter organ.

One thing, however, is very certain, that the treatment of placenta prævia—more especially since the suggestion of Professor Simpson of detaching the placenta as a remedial resource—has provoked a very bitter controversy—indeed, in some instances, the contest has assumed unmistakable evidences of what, in plain language, may be called strong personalities, a feature always to be avoided in scientific discussions. In the fierce conflict of the political arena, such episodes are more or less in keeping with the subject-matter, but they should find no foothold in a profession like ours, intended, through the development of truth, to confer health and blessings on the human family.

Dr. Barnes, so well known through his important contributions to obstetric science, is opposed to any attempt at forced effort for the purpose of detaching the placenta, and we are happy to find him so conservative on this interesting point. Nothing, in my opinion, will justify a forcible introduction of the hand into the uterine cavity—for violence, under these circumstances, will incur

* Practical Observations, 2d Ed., p. 312.

the serious peril of rupture of the organ—and well may it be asked *cui bono?* But Dr. Barnes, while opposed to artificial detachment of the entire placental mass, strenuously inculcates the advantage of partial artificial separation as a means of arresting the hemorrhage. It strikes me, however, that by thus increasing the area of the bleeding surface, we must necessarily increase the profuseness of the hemorrhage. His arguments are quite ingenious, and his essay well worthy of attention; * but it does really appear to me, after a careful perusal of his excellent monograph, that the lesson he teaches is not without objection. At all events, I may be permitted to express the opinion that the views of Dr. Simpson with regard to the entire separation of the after-birth, and those of Dr. Barnes touching its partial detachment, are questions to be determined, not by the reasoning of clever minds, but by the positive results in practice, which the future may disclose, either affirmatively or negatively.

The plan of artificial detachment of the placenta was suggested to Dr. Simpson from a consideration of the high mortality of the operation of turning compared with that following cases of *spontaneous* detachment or expulsion of the placenta previous to the birth of the child; the mortality in the latter case being but one in fourteen. Cessation of hemorrhage took place in these cases immediately, for the most part, upon the detachment of the placenta; and believing that the same result would follow its artificial detachment, he suggested this as a resort in all cases of labor thus complicated, in which, from rigidity of the os uteri, or extreme exhaustion of the patient, turning could not be prudently resorted to.

It has been objected to Dr. Simpson's statistics, that they embrace cases not adapted for comparison, including, as they do, cases occurring at every age, subjected to every variety of treatment, and some to no treatment at all; also cases complicated with rupture of the womb, convulsions, contracted pelvis, &c.

To meet this objection, Prof. Trask, in his essay already alluded to, has collected all the published cases to which he had access, together with others communicated to him. He has analysed them with a view of presenting, as far as possible, the influence of various circumstances and conditions of the patient in determining a successful or fatal result. Anxious to give the reader the benefit of Dr. Trask's researches, and of affording Prof. Simpson the full benefit of his conclusions, I shall briefly allude to some of the most interesting and important, which are as follows:

"The teachings of the best authorities are confirmed, that the period of greatest danger is between the seventh month and the completion of pregnancy. Of the *presentations* in the 353 cases, 113 were of the head, or the head complicated with descent of the

* The Physiology and Treatment of Placenta Prævia. By ROBERT BARNES. 1857

funis or hand; 21 of the superior extremity; 22 of the pelvic extremity, and 2 of the umbilicus; the remainder were probably, for the most part, of the head, but the proportion of unnatural presentations is very marked.

"From Table I., embracing cases subjected to ordinary modes of treatment, or dying undelivered, we learn that there were 141 recoveries and 59 deaths, or a mortality of 1 in 3.4."

The influence of hemorrhage previous to delivery in affecting the result is thus shown: "If we now compare the 84 cases in which the hemorrhage was very severe, among the *recoveries after artificial delivery*, with the 12 in which it was moderate, we find the cases of 'moderate' bear to those of profuse hemorrhage the proportion of 1 in 8 of the whole. Among the *fatal cases* after artificial delivery, the proportion of moderate to severe hemorrhage is 3 in 47, or about 1 moderate to 16 severe. Of cases requiring artificial delivery as a whole, there was 1 case of moderate to 11 of severe hemorrhage, while of those delivered spontaneously there was 1 moderate to 5½ severe. There is also a correspondence between the degree of presentation and the necessity for artificial delivery. Among cases of spontaneous expulsion of the child, there was a much larger proportion of *partial* presentations, and, as a consequence, less hemorrhage, and therefore a lower rate of mortality.

"Adding the cases of Drs. Lever and Merriman to the cases in the table, we get a total of 96 saved, and 166 lost, or 1 in 2.7 of the whole saved. The mortality to the child in the cases of the practitioners of Hesse-Cassel is even greater, 85 having been born living, and 251 dead, or 1 3.9 of the whole saved.

"Table II. embraces 36 cases of spontaneous expulsion of the placenta; in these but 2 deaths are noted, both from diarrhœa subsequent to labor."

Dr. Trask adds to his cases others recorded by Dr. Simpson, and of the whole, 59 required manual assistance, while 78, or 57 per cent. were delivered by natural effort. Of cases embraced in the first table only 17 per cent. were delivered spontaneously; the inference is that "cases in which the placenta is expelled before the birth of the child, as a class, are characterized by a tonicity of the womb and a vigor of uterine contraction which we do not find in ordinary cases of the accident."

There were 140 recoveries and 11 deaths, or a mortality of about 1 in 14. Dr. T. next proceeds to inquire what success has attended artificial detachment of the placenta, as an expedient for putting an end to hemorrhage. "In Table III. are recorded the histories of 66 cases. The mortality of cases thus treated is stated to have been 1 in 4.6. The gross mortality, after its performance in the cases composing this table, is therefore somewhat less than the

general mortality under ordinary modes of treatment, and especially after turning; but it is very much greater than after spontaneous expulsion of the placenta. In explanation of this, our author proceeds to show that the proportion of complete presentations was considerably larger among these than among cases constituting the first table; that the proportion of cases in which the hemorrhage was very alarming was much greater, and that alarming exhaustion occurred in a much larger relative number than among cases in the first table. In other words, cases in which detachment was resorted to were, for the most part, at the time of the operation in a far less favorable condition for recovery than were the cases in which artificial delivery was resorted to. This circumstance is, of course, entitled to great weight in comparing the results of the two modes of practice.

"About one in three of these cases was delivered by spontaneous expulsion of the child, a much larger proportion than among cases of the first table. This fact, which is apparently at variance with the statement as to the unusual severity of the cases we are considering, receives a happy explanation in the following facts. In the *spontaneous deliveries*, after *spontaneous separation* of the placenta, the child followed the placenta, in more than half the cases, in ten minutes or less, while in the *spontaneous deliveries* after *artificial detachment*, the child followed the placenta after a more or less protracted interval. In the first case the contractions of the womb expelled placenta and child nearly together, but in the cases of artificial detachment, the hemorrhage having ceased in consequence of the detachment, the vital powers have rallied, and, at various intervals from one-half hour up to eighteen hours, have expelled the child.

"This table gives abundant evidences of the hæmostatic powers of artificial detachment. Of 66 cases, in 35 hemorrhage ceased immediately and entirely, and in the remainder, with scarce an exception, it continued but a short time and in trifling degree.

"Fifteen children were saved and thirty-two lost, or a trifle less than one in three saved. It is evident that unless delivery soon follow this operation, the life of the child must almost necessarily be sacrificed. The result here given does not differ much from the results following turning and spontaneous expulsion of placenta, in which a trifle less than one in three were saved. It is quite probable that, as suggested by Dr. Barnes, the detachment, in at least some of the instances in which the child was saved, had been only partially effected.

"The plan of partial detachment, as recommended by Dr. Barnes, is designed to meet the objection to total detachment which arises from the peril in which it places the child; sufficient connexion

with the mother still remaining to allow of changes in the blood required by the child."

Ergot—the *secale cornutum*—is a remedy much employed by many practitioners in *placenta prævia*. The well-known influence exercised by this agent in the production of uterine contraction has caused, I fear, a too indiscriminate resort to it. I have great confidence in ergot, under its judicious administration, but I must protest against its empirical employment. I am opposed to its use in *placenta prævia* in the following conditions: 1. If the mouth of the uterus be sufficiently dilated to enable the accoucheur to have recourse to artificial delivery, the administration of ergot will, through the increased contraction it occasions, seriously interfere with the birth, whether it be accomplished by version or the forceps; 2. If there be a cross-presentation of the fœtus, then the remedy should not be given, from the very fact that the increased force of the uterus may, under the circumstances, cause rupture of the organ. On the other hand, should the presentation be right, and the hemorrhage continue, notwithstanding the tampon, which sometimes may be the case, then I should advocate ergot, *even if the os uteri were not dilated*.

Under ordinary circumstances, one of the fundamental conditions justifying a resort to this drug is—that the mouth of the womb shall have undergone a measure of dilatation. But in the case under discussion I take exception to this rule, and for the very obvious reason that the *os*, although not dilated, will, from the quantity of blood lost, be more or less relaxed and dilatable; and, therefore, the action of ergot, in lieu of mischief, will, through the increase of contractile effort, promptly accomplish the required dilatation, and oftentimes most happily promote the delivery.

One word regarding the rupture of the membranous sac in *placenta prævia*. If the hemorrhage be profuse, not controlled by the tampon, and the *os uteri* undilated, the rupture of the membranes will not be bad practice; for here, too, the *os*, though not dilated, is more or less relaxed in consequence of the depletion; the escape of the amniotic fluid will impart activity to the contractions, and if it be found necessary, the moment it can be done, introduce the hand and terminate the delivery; or, if the head should have passed into the pelvic cavity, the forceps will be the resource. But how, in *placenta prævia*, with an undilated *os uteri*, is the sac to be ruptured? The best mode of doing this, is cautiously to penetrate, by means of a small catheter, the placenta, and allow the fluid to pass off through the instrument.

Accidental Hemorrhage.—The character of flooding, which we have just been describing, is, as you have been informed, known as *unavoidable*, for the reason that it is in close relation with the implantation of the placenta over the cervix uteri. *Accidental*

hemorrhage, on the contrary, is in no way connected with placental presentation, but occurs when this body is in union with other portions of the uterus. It may present itself at any period during gestation, or at the time of labor. We have already spoken of this form of hemorrhage in the earlier months of pregnancy, when discussing the interesting subject of abortion. To-day, we shall confine our remarks to accidental flooding in the later months, or second half of pregnancy, also, after the parturient effort has commenced. The true pathology of this form of bleeding is a partial or complete separation of the placental mass from the internal surface of the uterus; and the causes capable of inducing the detachment may be enumerated as follows: premature contractions of the uterus; external violence, such as falls, blows, carrying heavy burdens, etc.; mental emotion, sudden congestion of the womb, or undue pressure on the hypogastric region; riding on horseback, or in a carriage, especially over rough roads or streets; among these causes, too, we are not to omit to mention the fascinating, but oftentimes dangerous polka and waltz.

One of the severest, and, for the time being, most perilous examples of accidental hemorrhage I have ever attended, was in the person of a lovely young married woman, who, although in most other matters, a sensible and refined lady, was so wedded to the dance, that, at a brilliant reunion, she could not resist the temptation to "take a turn," though nearly seven months pregnant! In half an hour afterward, she was attacked with flooding, and the scene was soon changed. She was transferred from the gay hall of fashion to the sick chamber, which was near proving to her the chamber of death! By constant and untiring effort, I succeeded in carrying her to the eighth month of her gestation, and then was fortunate enough to deliver her of a living child. I doubt, with the sad experience of her folly, whether she will again, under similar circumstances, be induced to "take a turn."

It will occasionally happen that, from some morbid condition of the after-birth, a portion of it will become detached from the uterus, thus giving rise to hemorrhage. I have met with a fair share of such cases. A good observer, and an eminent practitioner, Dr. Robert Lee, of London, maintains with much positiveness, that another cause of accidental hemorrhage is a shortening of the cord by being twisted around the neck of the child, thus inducing a partial detachment of the placenta. With all the respect I entertain for this distinguished writer, and with, I hope, a due appreciation of his courtesy on my visit to London some five years since, I must say that my experience does not accord with his on this point. I have seen many cases in which the cord encircled the neck of the child—indeed, it is by no means a rare occurrence—but I have never known a single instance of hemorrhage arising from this cir-

cumstance. The thing, I admit, is possible, but not very probable, and for this reason, perhaps, it may be enumerated among the causes of the accident. Scanzoni also participates in the opinion of Dr. Lee on this point.

There is one fact to which I desire especially to direct attention, as an agent in the production of accidental flooding, and to which I do not think authors have attached sufficient importance. I allude to *habitual and obstinate constipation*. I could cite more than one instance in which I am quite satisfied the violent straining induced by this condition of the bowels has occasioned detachment of the placenta in some portion of its surface, and consequent hemorrhage. Therefore, remember it is essential, for this as well as for other reasons, that the bowels of the pregnant female be properly regulated.

Is it possible to confound accidental hemorrhage in the latter months of gestation with a discharge of blood altogether unconnected with a detachment of the after-birth? This question is not without interest, and needs a moment's consideration; it necessarily involves the inquiry, whether a pregnant woman at this period of gestation can lose blood from the uterus, and the ovum preserve its full integrity of union with the organ. There can be no doubt that this may occur; you have already been told that some women menstruate, although pregnant; again, certain morbid conditions of the uterus may give rise to hemorrhage, and none of more importance, so far as a correct diagnosis is concerned, than polypus or a sub-mucous fibrous tumor of the organ. The diagnosis in such cases would not be difficult, and it is scarcely necessary for me to dwell longer upon the point than merely to remind you of the possibility of such contingencies.

The placenta may become detached in two ways, even when its separation from the uterine surface is only partial; for example, the detachment may be more or less slight at some point of its circumference; this is the ordinary form of separation, as connected with accidental hemorrhage, and the bleeding is usually not profuse; it may occur several times during the pregnancy at an interval of some days, and it is generally of but little significance so far as the safety of the mother or child is in question. In these cases, rest in the recumbent posture, and a quiet mind, together with cold drinks at the time of the bleeding will generally suffice, and the patient be carried to the completion of her period. Yet a different state of things occasionally presents itself in this special form of placental detachment—the hemorrhage being most profuse, and menacing the lives of both child and parent. Here, the tampon should not be employed, for it cannot reach the source of the flooding, and its only tendency would be the conversion of an external into an internal hemorrhage. If the bleeding should not yield to

the means already cited—rest in the recumbent posture, elevation of the hips, cold drinks, etc., then there should be no scruple as to the course to be pursued—premature labor should be brought about

Sometimes, the partial detachment of the after-birth, and the consequent hemorrhage, will be the result of premature contraction of the uterus, this being induced by some moral or physical cause. In such an event, the attention of the practitioner should be directed, if possible, to the lulling of these premature efforts, and for this purpose opium in some one of its preparations may be resorted to. I have great confidence in these cases in an opium suppository, one or two grains, introduced into the rectum, or thirty or forty drops of the tincture in a wine-glass of tepid water thrown up as an injection.

There is, however, another form of accidental flooding connected with partial detachment of the after-birth, most insidious in its inception, and at the same time fearful in its results—I allude to that condition of the placenta in which its entire peripheral border continues in union with the uterus, and the separation is limited to its central portion. Here there will be a species of pouch formed, into which the blood will be pouring from the utero-placental vessels; in this case, however, there is no external evidence of hemorrhage; the blood does not, for it cannot pass from the uterus. It is veritably a concealed or internal hemorrhage, and the work of death may be accomplished before the practitioner even suspects the cause of the danger. Indeed, I am much disposed to refer some of those cases of sudden and supposed inexplicable dissolution, which occasionally occur in the latter part of pregnancy, to this peculiar, but happily not common form of hemorrhage. As I have just remarked, the blood does not escape externally, and therefore you are deprived of this physical proof; the only and oftentimes fatal evidence of the central separation of the placenta will be the exhaustion of your patient; the face grows pale, the heart becomes weak in its pulsations, the countenance presents the appearance of serious dilapidation, and, if some check be not speedily given to the bleeding, the patient sinks. In instances like these there is necessarily much embarrassment; and it is difficult to know what to do.

Usually there are no striking premonitory symptoms, and the counsel of the practitioner is not demanded until the mischief is far advanced. If, however, you should be called to a case of sudden prostration in the latter months of gestation, unexplained by any antecedent circumstances, it will be well to think of the possible connexion between this exhausted condition and central detachment of the placental body; and if you should be satisfied that the relation of effect and cause really exists, then, in my judgment, the only hope will be in the prompt evacuation of the uterus, in order that, through efficient contraction, the bleeding vessels may be closed. Under these circumstances, I should not hesitate, at once to introduce a catheter into the uterus, and puncture the membranes with

a view of allowing the liquor amnii to pass off, and thus evoke the needed effort. This would probably be the promptest and most certain method of accomplishing the object.

Accidental Hemorrhage at the time of Labor.—If this character of hemorrhage should occur during the progress of labor—it cannot be regarded a frequent complication—it will need all the attention of the accoucheur. If it be profuse, and cannot be checked by the application of cold to the abdomen, or the introduction of a small piece of ice into the vagina, or injections of ice-water into the rectum; and it be ascertained that one of the extremities of the foetal ovoid presents, the element of hope will be in the rupture of the membranous sac, and, if this should not suffice to promote strong uterine contraction, recourse may be had to ergot. Should the hemorrhage, in defiance of these means, still continue—a rare circumstance—the labor must be terminated artificially either by the hand or the forceps. In the event of a cross-presentation, which, as I have just said, would contra-indicate both ergot and rupture of the membranes, the finger should be introduced into the os uteri, and gentle efforts made to dilate it. This species of titillation will oftentimes be followed by the happiest effects, and moreover, it must be recollected that, in these cases of loss of blood, the rigidity of the muscular fibre of the uterus is very much reduced, and, as a general rule, the dilatation of the mouth of the organ by means of the finger is more or less readily accomplished; the moment it is sufficiently open to permit the introduction of the hand, the indication is to proceed without delay to turn the child by bringing down the feet; for, the earlier version is attempted in cross-births—all things being equal—the greater the probability that the operation will be successful.

Sometimes, when the hemorrhage continues without dilatation of the os uteri, and it is not characterized by such abundance as to compromise the safety of mother or child, great benefit will be derived from the judicious administration of anodynes, nothing better in these cases, if the stomach will tolerate it, than Dover's powder, in five grain doses as circumstances may indicate. Should nausea or vomiting preclude its administration, morphia or opium, should there be no contra-indication, may be substituted.*

It will be perceived that I have said nothing touching the use of stimulants in the exhaustion so apt to accompany these losses of blood, whether from placenta prævia or accidental hemorrhage. The great object of treatment is to arrest the bleeding by the various means indicated; at the same time, it will be necessary to sustain the strength by a judicious employment of laudanum, brandy, milk punch, etc.; and never omit, in these anæmic conditions, by means of hot flannels or hot water in bottles, to preserve, as far as may be, a proper temperature of the extremities.

* Opium will, however, in some cases, have a tendency to increase the vomiting.

LECTURE XXXII.

Puerperal Convulsions, the different periods of their Occurrence—**Muscular Action**, on what is it dependent?—**Nervous Disturbance**, Centric and Eccentric—**Causes of Eccentric Disturbance**—**Modus Operandi** of these Causes—**Treatment of Eccentric Convulsions** oftentimes empirical—**Cases in Illustration**—**Irritation of Uterus as a Cause of Puerperal Convulsions** during Pregnancy, at Time of Labor, and subsequent to Delivery—**Convulsions during Pregnancy** more frequent in the **Primipara**; why?—**Period of Life** at which Convulsions are most apt to occur—**Blood-letting and Opium** oftentimes routine in Treatment of Convulsions; just Distinctions essential—**Opium**, when a Stimulant, and when a Sedative—**Fatality of Stereotyped Practice**—**Excessive Blood-letting**; how it produces Convulsions—**Treatment of Convulsions** based upon their special Cause—**Sulphuric Ether** as a Therapeutic Agent—**Convulsions and Head Presentations**; relation of—**Artificial Delivery**, when indicated in Convulsions—**Divisions of Convulsive Diseases**; **Epileptic**, **Hysteric**, **Cataleptic**, **Tetanic**, etc.; how distinguished—**Hysteria** much more frequent in earlier months of Pregnancy—**Symptoms, Diagnosis, and Prognosis of Puerperal Convulsions**.

GENTLEMEN—We now approach the consideration of one of the most formidable and perilous complications of the lying-in-chamber—*puerperal convulsions*. They may occur during pregnancy, at the time of labor, or subsequently to delivery. Under any circumstances, their presence is fraught with more or less hazard to the mother and child, and, therefore, they claim the earnest thought of the accoucheur. As I am especially anxious to explain to you, as far as may be, the true pathology of convulsive movement, based upon a sound and rational physiology, you will permit me to recall to your recollection two great fundamental truths, for which we are indebted to the researches of Flourens and Marshall Hall. The former has demonstrated that muscular action cannot be produced by irritation, either of the cerebrum,* cerebellum, or purely cere-

* There is no doubt that strong mental emotion, accompanied by cephalalgia, obscure vision, etc., will sometimes be the starting point of convulsions both in the pregnant and parturient woman. All practitioners of observation have recognized this fact; but it must not, therefore, be concluded that the convulsion is the product, simply, of cerebral irritation, for this is adverse to a well-established physiological principle. The brain, in a variety of ways, may become the primary seat of some irritating cause, whether from congestions, slight effusions, or some toxæmic influence, such as uræmic intoxication, etc.; but this irritation cannot generate a convulsive movement, until it has affected the spinal cord, the great motor centre of the economy. It is an interesting fact, as pointed out by Andral and Brown-Séquard, that rigid spasms sometimes follow inflammation of the brain.

bral nerves, if the irritation be strictly confined to these portions of the nervous mass; and he has further shown that muscular movement is the product of irritation—either direct or indirect—of the true spinal cord* and muscular nerves. It cannot be questioned that this is one of the most important developments of modern physiology.

This great revelation, however, needed one more fact to impart to it its full interest, both in a physiological and pathological sense. The fact, as I have before remarked, has been supplied by Marshall Hall, who has demonstrated that irritation of the spinal cord may be induced through certain incident excitor nerves. Previously to the disclosure of this latter principle, it was supposed that all nervous aberrations, involving irritation of the spinal cord, were *centric*, or, in other words, the result of an influence applied directly to this nervous centre. I may, perhaps, be wrong in the remark that Marshall Hall was the first to call attention to this interesting fact, for the circumstance had been previously recorded by Whytt, Redi, Prochaska, Unzer, and H. Mayo; but I think it must be conceded that, without the practical application made by him of this great physiological truth, its benefit to science would have been extremely restricted. To him, therefore, belongs the honor of having faithfully and perseveringly insisted, not only upon its importance, but its indispensable necessity for the proper diagnosis and treatment of disease. Now that the action of the incident excitor nerves is understood, we have another division of nervous disturbance, viz., *eccentric*, in which an irritation is produced on the peripheral extremity of one or more nerves, and the impression thus made is conveyed by the nervous trunks to the spinal cord; the impression, altogether independent of mind, becomes a sensation, which results in a motor impulse; this latter is transmitted to certain muscles, and hence an abnormal movement of these muscles is the result. This is what is known as *reflex action*.

All nervous aberrations, of whatever grade, may very properly be divided into two classes—*centric* or *eccentric*; and you will find that this arrangement is not only founded upon a correct physiology, but will greatly contribute to the elucidation of that important chapter in your studies—nervous diseases. It is, therefore, under this classification that I propose to discuss the important question of puerperal convulsions, whether during pregnancy, as a complication of labor, or subsequently to the birth of the child. In either of these aspects, it is a question well entitled to the profound consideration of the medical man.

* It must always be borne in mind that the spinal cord, physiologically considered, is not the medulla spinalis of the anatomist; on the contrary, the true spinal cord consists of the medulla spinalis, medulla oblongata, pons varolii, crura cerebri, and the tubercula quadrigemina.

Eccentric causes. These act on the true spinal system through excito-motory influence, by the transfer of an undue or pathological impression. These causes may be enumerated as follows: 1. Indigestible food in the stomach; 2. Morbid matter of any description in the intestines, whether vitiated secretions, unassimilated food, or collections of fæces; 3. Irritation of the bladder or rectum; 4. Irritation of the uterine organs and vagina.

It is important to bear in recollection that these various causes, under given circumstances, are capable of evoking an attack of convulsions; so that, when called to a case of this serious nervous disturbance, your minds may be prepared, almost with the quickness of thought, to comprehend the relation of effect and cause, which may at the time exist between the convulsive movement and either of these specified agents. In this way, your diagnosis, sound at the very start, will enable you more successfully to meet the therapeutic indication. There is a vast deal both of routinism and empiricism in the treatment of puerperal convulsions, and this, I am quite confident, is mainly to be attributed to the fact that the practitioner in the hurry or, perhaps, alarm of the moment, suffers himself to regard the convulsion as a primary or idiopathic affection, instead of recollecting that in ninety-nine instances in a hundred it is but the product or result of some antecedent.

1. *Indigestible Food in the Stomach.*—Let us now inquire how it is that indigestible food in the stomach is capable of producing convulsions. It is not sufficient for you to know the fact; on the contrary, you should be content—when demonstration is possible—with nothing short of demonstration itself. Therefore, I now tell you, as a principle well settled, that in these cases the irritation is first produced upon the terminal branches of the pneumogastric* nerve, and is thus conveyed through that nerve to the spinal cord, constituting, as I have already stated, an interesting and striking example of eccentric influence. You are well aware, gentlemen, of my fondness for practical, bedside truths; in contrast with mere hypothesis, they constitute so many gems for the medical man. With this conviction, you will pardon me, I am sure, for introducing to your attention the following instructive case, the history and sequel of which are, in my opinion, the best comments I can offer touching the treatment of convulsions dependent upon gastric repletion:

Late in the evening of January 1, 1857, I was summoned in great haste to attend a young married lady, who was then in the eighth month of her pregnancy—a primipara; the messenger, her brother, told me she had just been attacked with a fit, and he desired very urgently that I would lose no time in hastening to the house. On

* The physiologist has shown that the pneumogastric is an excitor, and, at the same time a motor and ganglionic nerve.

my arrival, I learned she had been in excellent health up to that evening throughout the entire period of her gestation; but about half an hour before I reached the house, she had, while in agreeable conversation with her husband, been attacked with convulsions. I had scarcely entered her room before another paroxysm occurred, developing all the ordinary phenomena of eclampsia. The first question naturally presenting itself to my mind was, what does this mean, or, in other words, was there any special and extraordinary cause for this alarming state of the patient? Immediately, I made running inquiries as to her previous health, etc., which, as I have just remarked, had been most excellent. On questioning the husband closely, he informed me that his wife had partaken of a hearty tea, indulging freely in preserved quinces, and in addition, she had eaten a large quantity of plum-cake. Precisely two hours after this repast, the convulsions ensued. What, gentlemen, with these facts before you, would have been your judgment of the cause of the paroxysm, and what your treatment? Would you have applied a ligature to the arm and abstracted blood—the remedy of all others, in the opinion of some writers, which constitutes the *sine quâ non*, the very sheet-anchor of hope in puerperal convulsions—or would you, as I attempted to do, have taken a common sense view of the case, and referred the perturbation of the nervous system to the presence in the stomach of the *preserved quinces and plum-cake*, acting as an irritant on the pneumogastric nerve, and thus, through eccentric agency, causing the convulsion?

This was my diagnosis, and, as you will presently learn, my therapeutics were in perfect accordance with it. Without loss of time, I administered twenty grains of the sulphate of zinc in half a tea-cup of tepid water, with a view of a prompt liberation of the stomach from its offending contents. In less than three minutes the emetic began to take effect, and the lurking enemy, under the guise of quinces and plum-cake, was very soon ejected. The quantity of these substances thrown from the stomach nearly half filled an ordinary washbowl. The effect was all that could be desired; I remained with the patient four hours, there was no recurrence of the convulsion, and she lapsed into a sweet and undisturbed sleep; respiration natural, pulse soft and equable, and the countenance indicative of tranquillity. The most positive directions were given as to the necessity of adhering scrupulously to a simple and bland diet.* This lady passed on to her full time, when I had

* I took very good care—a practice I have been in the habit of pursuing—to test the urine for the purpose of ascertaining whether it contained albumen; there was not a trace of this element. This, therefore, was an example of convulsions purely due to nervous irritation induced by the presence of undigested food, and in no way connected with albuminuria or renal troubles. We shall, before completing the question of convulsions, discuss fully the subject of albuminuria.

the pleasure of presenting her with a fine boy. There was nothing whatever untoward during the labor, and her convalescence was not interrupted by any accident.

Is it going too far to surmise that, without the prompt action of the emetic, according to every law of professional calculation, the patient and her child would have both been sacrificed? I think not. But what prompted the administration of the emetic? Why, the obvious and imposing fact, previously ascertained, that the essential and only cause of the convulsive movement was the undigested mass in the stomach.

2. *Intestinal Irritation.*—Should the convulsions be traced to intestinal irritation, either from collections of fecal matter, undigested food, or vitiated secretions, the indication would be speedily to remove the offending cause by resort to a stimulating enema or a brisk cathartic.

3. *Irritation of the Bladder or Rectum.*—It may, however, happen that the true cause of the nervous paroxysm is irritation either of the rectum or bladder. An aggravated case of hemorrhoids, or a collection of feces in the lower bowel may give rise to convulsions. In the instance of hemorrhoids, my advice to you would be, not to hesitate an instant, but at once to disgorge them by a free puncture with the lancet. No tampering, negative treatment will do here; the life of your patient is in serious peril, and every returning paroxysm makes the peril greater. In the event of the irritation arising from masses of feces in the rectum, they should be dislodged by the aid of an active enema. If the cause of the convulsion be traced to irritation of the bladder, the first object of the practitioner should be to make a just discrimination as to the special character of the irritation, for it may be the result of various influences—retention of urine, or its extreme acidity, calculus in the bladder, or strangury. The indication of treatment, therefore, would depend upon what might be ascertained to be the true source of the disturbance. The following case has a practical bearing on the question now under consideration, and I shall cite it as an illustration of the necessity of thorough vigilance on the part of the medical man:

In June, 1856, I was requested by Dr. B. W. Johnston, of Long Island, to visit a lady with him, in the sixth month of her gestation. Four days before I saw her, she had been attacked with pneumonia. She was a strong plethoric woman, and the disease was in its very inception of a grave character; the doctor, on being called to her, very properly resorted to the lancet, and abstracted $\bar{\text{z}}$ xvj. of blood with decided temporary benefit; it became necessary, however, to repeat the bleeding in four hours; $\bar{\text{z}}$ viij. more were drawn; the patient was freely purged, and, through the administration of minute doses of tartar emetic, full action was promoted of

that important emunctory, the cutaneous surface. A blister was applied to the chest, and, in twelve hours after its application, the patient was attacked with slight convulsions. It was under these circumstances that I was requested to see her. When I visited her, the intensity of the pneumonia was broken, and so far as that affection was concerned the patient was making favorable progress. But a new phase had developed itself in the guise of the convulsion, which, although slight, was still significant of portending trouble. On inquiry, I learned that there had been no indiscretion of diet, nor were the bowels in any way constipated. Attention was next directed to the condition of the bladder, and the nurse, an intelligent woman, informed us that, for about an hour before the convulsion, the lady had complained of much smarting about the bladder, and would call for the chamber every ten or fifteen minutes, supposing that she could pass water, but at each time not more than a few drops were evacuated, accompanied by the most painful scalding. Now, gentlemen, what do you call this more or less constant desire to micturate, with an inability to pass more than a few drops, accompanied by a sensation of scalding? Is it not strangury? Unquestionably. In the case of this patient, can any of you, from the treatment of the pneumonia already described, be at a loss to account for the strangury? There is not one of you, I am quite confident, who is not prepared to tell me that it was produced by the absorption of the cantharides of which the blister was composed.* As soon as we had learned the existence of this vesical irritation, an important light was thrown on the cause of the convulsive movement. I had no doubt myself, and in this opinion Dr. Johnston fully concurred, that the nervous perturbation was occasioned by the strangury, affording a tangible illustration of convulsions from irritation of the bladder. With this diagnosis of the case, I suggested the following medicine, one pill to be taken every fifteen minutes until the strangury yielded:

℞
 Pulv. Doveri
 Extract Hyoseyam. }
 Pulv. Camphor. } aa. gr. xij.
 Ft. massa in pil. xij dividenda.†

The patient ‡ had not taken six pills before she expressed herself relieved of the strangury; there was no recurrence of the convul-

* Strangury is not a necessary consequence of the application of a blister, while at the same time, it more or less frequently results. I have seen, especially in children, who, it is well to recollect as a general rule sustain blisters badly, the most distressing suffering from strangury produced in this way.

† I have repeatedly found this an admirable combination in strangury from the absorption of cantharides, and can recommend it with much confidence.

‡ In this case, also, the urine was examined, but there was no trace of albumen.

sion; but I subsequently was informed by the doctor that she was delivered shortly afterward of a still-born child, bearing the evidences of having been dead for some days.

It is not of rare occurrence that the child is destroyed *in utero* during an attack of convulsions, and such no doubt was the fact in this instance. When the death of the fœtus takes place, this latter acts not unfrequently as a foreign substance, and evokes premature action of the uterus—a most fortunate provision, for the continued sojourn of a dead child in utero could not but seriously compromise the health and safety of the mother.

It can scarcely be necessary to remark that if, on examination, you ascertain the convulsions to be occasioned by the distension of the bladder, the remedy will be the prompt, but cautious introduction of the catheter.* I have mentioned that *calculus* may sometimes be the offending cause. Here, an operation for the removal of the calculus is out of the question; for the very attempt would most certainly aggravate the irritation, and thus excite the renewed paroxysms of convulsion. In such cases, the obvious duty would be, if the thing were possible, to have recourse to artificial delivery.

Irritation of the Uterus and Vagina.—I shall now speak of irritation of the uterus and vagina† as a cause, through eccentric action, of puerperal convulsions; and this irritation may develop itself during pregnancy, in the progress of labor, or after the birth of the child.

During Pregnancy.—It is an interesting question—Under what circumstances do convulsions most frequently occur in gestation? As far as statistics can establish the fact, and I think there is no fact better proved, they are, out of all proportion, more frequent in the *primipara* than in the *multipara*, both during pregnancy and labor, averaging over ninety per cent. Then, the inquiry necessarily arises, why is this? The explanation is not difficult. In a first pregnancy, the female, especially if her nervous system be delicately organized, is much more predisposed to nervous perturbations than one who has already passed through that process, and who, consequently, becomes to a certain extent accustomed to the excitement, which more or less usually accompanies gestation. Again: it is a well-established practical fact, that there is much greater

* It is always necessary, in the introduction of the catheter, to use caution and gentleness; but the observance of this rule is particularly called for in a case such as we are supposing, in which convulsions have ensued from vesical irritation; for the slightest injury to the urethra would be very likely to renew the paroxysm.

† It has already been stated that, in convulsions from undigested food in the stomach, the irritation is transmitted to the spinal cord through the pneumogastric nerve; but when the source of disturbance is in the intestines, or emanates from the uterus itself, the incident excitor nerve-fibres of the spinal and sympathetic uterine nerves are the media through which the irritation is conveyed.

rigidity of the os uteri in the primipara, which necessarily exposes the incident-excitator nerves of that part to increased irritation. Besides, when treating of albuminuria, its causes and effects, we shall tell you that congestion and other derangements of the kidneys are far more frequently met with in first than in subsequent pregnancies.

Another question of equal interest arises—Do convulsions manifest themselves, as a general rule, in middle life, or at an earlier period? The best observation, and the most accurate details show that the particular period of life at which they are most apt to occur, is between the ages of seventeen and thirty-five; and it may also be stated as worthy of note, that if they develop themselves before the sixth month of gestation, it is an exception to a very general rule; for the rule, founded upon the careful observation of practical men, is that, as a complication of pregnancy, in the great majority of instances, they take place between the seventh and ninth months.* This, too, is my own experience, and I believe it to be perfectly in accordance with facts. It has been positively affirmed by some writers that convulsions cannot be developed during pregnancy, unless they are preceded by contractions of the uterus. This opinion, however, is at variance with the observation of the lying-in room.

Treatment of Convulsions during Pregnancy.—Well, gentlemen, you are summoned to a lady in convulsions in the progress of her pregnancy, and labor has not commenced. What is to be done? Your action will depend altogether on the surrounding circumstances. We assume, however, that the convulsions here are due to uterine irritation simply, and are not complicated with uræmia, of which we shall speak hereafter. If you leave this university with the conviction, too sadly impressed upon the minds of some practitioners, that the reliable remedies in puerperal convulsions are blood-letting and opium, it is reasonable to suppose that one or other of these agents would be immediately resorted to. Let us, for a moment, pause and examine this point; this examination may

* Depaul mentions a case of convulsions in the fourth month of gestation.

† There prevailed many years since a very general opinion that puerperal convulsions were always due to one of three causes: constitutional irritability, excitability of the uterus from over-distension, or general plethora; and with this hypothesis, which has been handed down to the present day, we have the explanation why it is that one practitioner, who refers the convulsion to constitutional irritability, will employ opium: another, who can see nothing but excessive distension of the gravid womb as the cause of the nervous disturbance, will resort to immediate delivery; while the third, who always associates in his mind puerperal convulsions and plethora, will regard the lancet as his only hope. This, I think, will account, to a degree at least, for the routine practice, which has been adopted in the management of this serious affection; it shows also the folly of mere hypothesis, and at the same time the necessity for a rigid analysis of each case as it may present itself to the observation of the practitioner.

at some future time serve you, and protect your patients against the fatal consequences of stereotyped—I know no more emphatic term—practice. Here, then, is your patient, in gestation, and attacked with convulsions; the instant you approach her—true to the undying instincts of routinism, you call for a bandage and basin—the bandage is arranged, the basin all in readiness, and the lancet plunged into the vein. The blood flows, the patient faints; and soon after reaction comes on, there ensues another convulsion more marked than the preceding. You have not taken away blood enough, whispers that fatal delusion—routinism! The ligature is again applied, the orifice opened, and slowly runs the current! Syncope follows; the spark of life is again rekindled by a feeble reaction; another convulsion, and speedily death closes the scene, thus preventing further depletion! The practitioner, who has an abiding faith in blood-letting, as the only element of hope in puerperal convulsions, would, if consistent, say to the disconsolate friends, “Oh! if I had seen the case at the commencement, I should undoubtedly have saved that life!” To the ignorant and uninitiated such language may, perhaps, prove a mantle for the concealment of reckless and unjustifiable practice; but it will fail to appease the severe exactions of science.

So far, gentlemen, from depletion being indicated in the case just cited, it may peradventure be that the resort to the lancet is the true cause of death; and I will explain why this might probably be so. Suppose, for instance, the patient, from antecedent disease, hemorrhage, or from any other cause, should exhibit an example of *anæmia*; in such an event, this very anæmic condition may be one of the essential exciting sources of the convulsion. What, then, becomes of the potency of blood-letting in a case like this? Its only potency consists in the prompt extinction of life, through an aggravation of the anæmia. There is no fact more essential to be borne constantly in mind than the direct connexion which exists between excessive losses of blood, no matter how produced, and convulsions.

When an animal is bled to death, in the case of the calf or sheep, for example, the prelude to the death struggle will be convulsive paroxysms. How often do children succumb from convulsions induced by the large abstraction of blood, either by the lancet or leeches; and in these cases of convulsion from exsanguification of the system, the result is almost always fatal.* Be careful, therefore, how, without due consideration, you employ this remedy in early childhood, for its abuse will readily lead to serious consequences. Brown-Séquard, I have told you, has shown that the cause of the convulsion following excessive loss of blood is the same

* Convulsions from anæmia, whether the anæmia arise from blood-letting, hemorrhage, or any other cause are to be noted as of *centric* origin.

as in asphyxia—there is in fact an insufficient respiration, and, therefore, the amount of carbonic acid increases in the blood. The spinal cord and medulla oblongata become extremely sensitive to the irritation of blood containing a notable quantity of carbonic acid, and hence the convulsive movement.*

I have, I think, said sufficient to show you that the indiscriminate or routine practice of resorting to the lancet in the treatment of convulsions, is not only unsound, both in its physiology and pathology, but must, of necessity, sometimes prove a fatal practice. Therefore, gentlemen, when, in these cases, you place your hope in blood-letting, let it be a hope for which you can exhibit some substantial basis. I shall presently speak of the indications for the use of this heroic, but much abused, remedy.

Let us now, for an instant, turn to *opium*, the other routine agent. It is a habit with some practitioners to regard convulsions as exclusively traceable to a disquietude of the nervous system, without at all taking into account the collateral and accompanying circumstances; and, with this limited view of the pathology of the affection, they administer opium for the purpose of soothing the system, and producing sleep. In order that you may fairly comprehend the point, and fully appreciate the inevitable hazard of this limited and one-sided view, allow me, for the instant, to remind you of the true therapeutic properties of that important, and also much abused, agent—opium. In a plethoric condition of system, the direct tendency of this drug is to produce congestion of the two great nervous centres—the brain and spinal cord; and it is a well-established fact, that congestion of either of these important organs will, through centric influence, prove a fruitful cause of convulsions. With this proposition before you, the truth of which is universally conceded in theory, but too frequently forgotten in practice, do you not at once perceive the extent of the peril to which, of necessity, you will expose your patient, in the use of this medicine as a remedy in puerperal convulsions, unless it be administered with judgment, and with a due regard to its special therapeutic action? Again: if the system be greatly prostrated by previous losses; if, in a word, the patient be in an anæmic state, then opium conjoined with brandy, ammonia, or coffee, is a valuable remedy; it is, indeed, in these cases, oftentimes the means of saving human life. You see, therefore, that this medicine, in the affection of which we are now speaking, can be regarded as appropriate only when given with due discrimination; and the same remark applies with equal force to all remedial agents.

* The admirable researches of Kussmaul and A. Tenner on the convulsions caused by losses of blood, would lead to the opinion that it is chiefly irritation of the medulla oblongata and pons varolii, which induce these convulsions. [*Journal de la Physiologie de l'Homme et des Animaux*. Tome 1, p. 201.]

In the treatment of convulsions during pregnancy or labor, you are to look beyond the mere paroxysm; you should, as far as may be, endeavor to ascertain the cause of the nervous disturbance, and not blindly have recourse to remedies, which, too often, have nothing to recommend them in given cases but mere custom. Just discrimination is a very necessary and essential element in the character of a medical practitioner; he should school himself to close observation, so that, through rigid analysis, he may be enabled to deduce truthful conclusions. Therefore, instead of having your minds fettered by preconceived opinion in regard to any particular form of treatment, you should be careful to subject opinion to circumstances as they may develop themselves in the sick-room. If you do this, your therapeutics will not only be in keeping with the philosophy of science, but the results will be likely to be satisfactory.

In illustration of this remark, I shall now endeavor to show you under what circumstances blood-letting will be indicated in convulsions during gestation. Suppose, for instance, the patient should be plethoric, with a bounding pulse, and flushed countenance. Would any man, in his senses, hesitate, with these premonitions of danger, as to the course to be pursued? I think not. Here, prompt and full depletion by the lancet is urgently demanded for two substantial reasons: 1. The vascular fulness may be the cause of the convulsive paroxysm, in consequence of congestion of the spinal cord, or of the brain, indirectly affecting the cord.* 2. During the convulsion, the patient will incur the hazard of death from apoplexy, if the plethora continue undiminished. The bleeding, however, to be of value, must be sufficiently copious, the quantity abstracted being regulated by the peculiar circumstances of the case, of which the practitioner is to be the proper judge. Should it be necessary, let the operation be repeated until a decided impression is made on the system; what I mean by a decided impression is the evidence afforded that the plethora has yielded to the depletion.

In all cases of convulsions with vascular fulness, it is highly important that there should be a prompt and free action of the bowels.

* It has been shown by the pathologist, in the autopsies of women who have died during gestation or labor, that either of these latter conditions is usually accompanied by what is termed a passive engorgement of the inferior portion of the spinal cord. This fact evidently demonstrates a peculiar predisposition, both during pregnancy and labor, to congestion of the cord, and, consequently, to convulsions from this centric influence. Yet, notwithstanding this predisposition, it is not true, as some writers have attempted to show, that plethoric women are more commonly attacked with convulsions than those of a debilitated and broken-down condition. On the contrary, women who, from certain pathological influences, have suffered from change in their blood constituents, as denoted by their cachectic and hydropic states, are the very women most likely to suffer from convulsions.

This may be accomplished with medicine by the mouth, or, in the event of the patient not being able to swallow, by means of a purgative enema. A very good cathartic, under the circumstances, is the following draught:

R
 Infus. Sennæ f. $\frac{3}{4}$ iv
 Sulphat. Magnesiae 3 ij
 Manna 3 i
 Tinct. Jalapæ f. $\frac{3}{4}$ ij.

M.

But, gentlemen, I must apprise you of one fact never to be lost sight of when treating convulsions: it is this—*delay is oftentimes the cause of death*; and I regard it so essential, in connexion with the abstraction of blood, to have a prompt movement of the bowels, that I am in the habit of resorting to what I have found not only a prompt but an efficient remedy—*croton oil*. There is, I think, an unfounded prejudice against this medicine. I have heard practitioners object to its use because of the apprehension that it would produce *hypercatharsis*, or excessive purging. I have employed it repeatedly with children and adults, and I believe it to be, under discreet administration, a safe and invaluable agent. I have on several occasions resorted to it in convulsions, and with decidedly good effect:

R
 Olei Tigllii gtt. iv
 Sacchar. Alb. 3 ij
 Mucil. Acaciæ f. $\frac{3}{4}$ i.

M.

a tea-spoonful every fifteen minutes, until the bowels are moved.

Here, we have an important auxiliary in connexion with the lancet and croton oil—I mean cold applications to the head; they will prove of very material service, and should not be omitted. As an adjuvant, also, in these cases, we have an admirable remedy, which I think was first introduced to the attention of the profession, in the treatment of convulsions, by Dr. Collins, of Dublin. I allude to tartarized antimony in small or tolerant doses, the object being, under its administration, to keep up a relaxed condition of the system. But the remedy of all others, after the circulation has been brought under proper control by the due abstraction of blood, etc., is the inhalation of ether, not administered so as to destroy consciousness, but merely to produce a soothing influence on the nervous system. I can speak of this agent—which is another of the abused articles of the materia medica—with great confidence in this emergency, for I have tested it in the most satisfactory manner. Its chief efficacy, in these instances, is, I think, to be ascribed to its power of diminishing reflex sensibility. *Never,*

however, have recourse to it in cases of plethora until, by the judicious use of the lancet, the circulation has been duly equalized. In cases, also, in which there is no vascular fulness, and the convulsion can be traced simply to nervous irritability, ether will prove invaluable from the first.

If the convulsions, as will sometimes happen, continue in defiance of these remedies, then the question presents itself, can nothing more be done? This brings us to the consideration of exciting premature action of the uterus, so that its contents may be expelled. If, in your judgment, after weighing with due care all the circumstances of the case, you should be confirmed in the opinion that delivery is the only alternative, in order to save either mother or child, then I need not assure you that the course to be pursued is a very plain one, and without delay you should proceed to evoke uterine contractions. The mode of doing this, and the various plans suggested by authors, will be stated when treating of *premature artificial delivery*. It may be mentioned in connexion with this topic that if the child should be ascertained, through auscultation or other means, to be dead, and the convulsions still continue, then the expediency of bringing on labor is the more urgent, in order that the life of the mother may not also be sacrificed; and, moreover, the death of the child removes the only valid plea against the operation.

During Labor.—When convulsions occur during labor, they may do so at the commencement of the parturient effort, during the process of dilatation, or, as I believe most frequently takes place, they may manifest themselves after the head has left the uterus, and is pressing upon the vaginal walls, and especially during the last struggles just as the head * is about to make its exit. The treatment of convulsions at the time of parturition will generally vary according to the particular stage of labor at which they manifest themselves. In all cases, however, where there is an evident plethora of system, the free use of the lancet must immediately be resorted to for reasons already explained; the therapeutic principle, which is to guide you, is precisely the same in convulsions with plethora, whether they occur during gestation or at any stage of labor.

It may, however, be that the convulsive paroxysm commences soon after the inception of labor in a patient, who does not exhibit vascular fulness, but whose throes of parturition are severe

* It is an interesting fact to note that when convulsions occur during labor, they do so in the great majority of cases in head presentations; and strange as it may appear to those who have not examined the subject, they are extremely rare in malpositions of the fetus. It is stated as the result of the combined observation of Drs. Clarke, Labatt, and Collins, in the Dublin Lying-in Hospital, that there was but one case of convulsions coincident with malposition in 48,397 labors.

and in quick succession. It may then become a question whether, under the circumstances, the convulsions are not altogether due to the unusually rapid succession of the pains. If so, I know of no remedy equal to the belladonna,* for I am quite satisfied that it possesses two important attributes, one of which, at least, has, perhaps, not been sufficiently appreciated in the practice of midwifery: these attributes are *the hulling of uterine contraction, and the promotion of dilatation of the mouth of the organ*. Therefore, in the case we are now speaking of, I should recommend you to lubricate the os uteri freely with the belladonna ointment 3j of the extract to ʒj of adeps. If this should prove as efficacious in your hands as it has in mine in subduing inordinate contractions, then I am sure you will unite with me in regarding it, under the circumstances, a most valuable remedy. In cases, too, in which, from antecedent disease or other conditions, the health of the parturient female has become much disturbed, leaving her in a state of more or less exhaustion, it may become desirable to check, for the time, the action of the uterus, more especially when it is severe and in such quick succession as to exhaust the strength of the patient; in such instances, you possess in the belladonna an efficient means of fulfilling the indication.

Much has been said about the propriety of rupturing the membranes in cases of convulsions, for the purpose of evacuating the liquor amnii; and the suggestion is advanced by many practitioners on the ground that, on the escape of the amniotic fluid, the uterus becomes diminished in size, the tension is removed, and consequently the uterine irritation being thus sensibly lessened, the

* It is well understood that the contractility of the uterus can either be excited or depressed through the action of certain agents; and it is a knowledge of this fact, which oftentimes enables the practitioner to render essential service to his patient. For example, we know that cold, nervous excitement, ergot, titillation of the os uteri, electricity, etc., are so many influences capable of inciting contractions of the organ; on the other hand, anodynes, depression of mind, and more especially belladonna, exhibit very sensibly their power in quieting this contractile force. Some very interesting experiments have been made by Mr. T. Wharton Jones and others to show the effects of belladonna on the circulation. Mr. Jones found that an artery in the web of a frog exhibited, under the microscope, a constriction amounting almost to obliteration on the application of belladonna; while, at the same time, the blood in the corresponding capillaries and venous radicles was in a state bordering on stagnation. It would seem, therefore, that this remedy does not act directly on the muscular fibres of the uterus, but exerts its influence on the walls of the blood-vessels distributed throughout the organ; and this influence on the vessels has been explained as follows: the belladonna, it is said, excites the great sympathetic nerve or the small nervous filaments accompanying the vessels; under this excitement, the vessels contract, and consequently the quantity of blood they receive being greatly lessened, the uterus occupies a smaller space, and its tissues become diminished in general volume. But it must be remarked that the reason why the uterus relaxes when belladonna is applied is—that the blood-vessels contract, and the tissue of the organ not receiving blood enough necessarily becomes softened.

convulsions will cease. I can see no force in this argument, and I am convinced that the rupture of the sac before the proper dilatation of the os uteri is bad practice, and oftentimes will be followed by increased paroxysms of convulsions, for the reason that, *as a very general rule, the contractions of the uterus are marked as soon as the liquor amnii has passed away.** If, however, the dilatation have been accomplished, there can be no objection to affording the escape of the waters by rupture of the membranous bag. It must be recollected that ether is an important resource in the convulsions of labor, as we have shown you it is in pregnancy where parturition has not commenced, and, with the restrictions previously mentioned, you will find its employment most satisfactory.

When it is practicable, there can be no doubt that the important indication—indeed, the very best practice in convulsions at the time of labor, is to deliver the patient. Some authors recommend *version* when the head is at the superior strait, and the mouth of the womb in a condition to justify this operation. With this view, under certain restrictions, I coincide. If you will permit me to express a positive and emphatic opinion on this point, it is, *that under no circumstances should version be attempted in puerperal convulsions, unless the patient be previously placed under the full influence of anæsthesia*, and for the following reasons: 1. The very introduction of the hand into the uterus constitutes an exciting cause, which would almost certainly evoke the convulsive paroxysm; 2. The manipulations necessary to accomplish the delivery would so irritate the organ as to subject, through a repetition of the convulsion, the life of the mother to the most serious peril.

The two next alternatives are the *forceps* and *crotchet*. If the head be well down in the pelvic cavity, there should be no hesitation in using the *forceps*; † if, on the contrary, it still be at the

* This is readily accounted for. When the amniotic fluid is evacuated, the uterus then comes more or less in direct contact with the surface of the fœtal body; this contact, through reflex action, tends to stimulate the muscular fibres of the organ to increased effort, and hence the marked or expulsive force which follows.

† A short time since, I was requested by one of our most eminent surgeons to visit his daughter, who was then in labor with her first child, in consultation with Dr. Sands, Dr. John Watson, and Professor Carnochan. The lady was in delicate health, and she had been in labor some twelve hours; she had three convulsions before I saw her. On reaching the house I was requested by the medical gentlemen to make an examination, and found the head descending in the pelvic cavity. The convulsions, they informed me, had not developed themselves until the head had begun to make severe pressure on the os uteri. There was a general concurrence of opinion among us as to two points: 1. That the convulsions proceeded from irritation of the uterus; 2. That the indication was to place the patient under the influence of ether, and deliver by the forceps. They kindly requested me to apply the instrument, and in a few minutes I succeeded in delivering the lady of a

upper strait, I should advise you not to apply them, version being preferable. I should be unwilling, as a general principle, to have recourse to the *crotchet*. If the child be living, the use of the instrument would be without justification, and if it be dead, it could be much more speedily removed by the forceps.* No matter how skilfully the *crotchet* may be employed, there is always more or less delay in the delivery by this means, and the irritation to which the parts are exposed during the operation, is an exciting cause to a return of the convulsion.

After Delivery.—You will occasionally meet with cases in which, after an auspicious delivery of the child, convulsions will occur; and it is right that you should understand the contingencies which may produce them. I believe they may be enumerated as follows: 1. Hemorrhage; 2. The detached placenta, partially through the mouth of the uterus, inducing irritation; 3. The presence of coagula of blood causing distension, and consequent irritation of the *os uteri*; 4. The rude introduction of the hand of the accoucheur into the vagina or uterus, for the purpose of extracting the placenta; 5. Inversion of the uterus. These may be regarded as the chief causes of convulsions occurring subsequently to the birth of the child; it is, however, to be recollected that post-partum convulsions will sometimes be but the continuation of the attack prior to the delivery.

I have already called your attention to the relation which subsists between excessive losses of blood and convulsions, whether in the puerperal female, or in the young child; and, therefore, it is not necessary for me again to allude to it. When the convulsion is clearly traceable to hemorrhage, the broad indication is, to endeavor promptly, after the arrest of the bleeding, to rally the dilapidated forces, and for this purpose I know of no remedy so certain in its efficacy as laudanum, in union with stimulants; a teaspoonful each of laudanum and brandy, in a wine-glass of water, repeated every ten or fifteen minutes, according to the emergency; or a spoonful of laudanum in a wine-glass of coffee; the strength afterwards to be guarded by animal broths, etc.

What connexion is there between a detached after-birth partially through the mouth of the uterus, and convulsions? This is an important question, and its solution easy. The presence of the placenta induces irritation of the incident-excitor or sensitive nerves, and hence the convulsive paroxysm, through eccentric influence, as has been already explained to you. The remedy in this case is to remove the placenta without delay; and, if there

living child. There was no recurrence of the convulsive paroxysm, and she had an auspicious convalescence.

* If, however, decomposition had commenced, so that the forceps could not get a proper purchase, then the *crotchet*, as a matter of necessity, must be resorted to.

be no contra-indication, let the system be quieted by a full dose of laudanum and brandy; or the inhalation of ether, not so as to destroy consciousness, may be practised with decidedly good effect. The same remark is applicable to the presence of coagula; they should be instantly removed, and repose of the nervous system induced.

In case of inversion of the uterus, every care should be taken, as speedily as possible, to reduce the displacement; should this fail, and the convulsions continue, I would advise the free use of the belladonna ointment, both on account of its composing and relaxing effects. When convulsions occur after delivery, they are usually less violent, and also less fatal. But, as you must plainly see, it is most material that the accoucheur should early comprehend the true cause of the paroxysm, in order that he may at once proceed to remove it.

Symptoms.—Puerperal convulsions may be said to present, as a general rule, two orders of symptoms: 1. The precursory; 2. Those which accompany or characterize the attack. The former, or precursory, consist in more or less uneasiness, and an undue degree of nervous irritability, great restlessness, severe cephalalgia, confusion of ideas, loss of memory, twitching of the muscles of the face and extremities. But it may happen that, without any of these premonitions, the convulsive movement displays itself by a sudden exhibition of the symptoms, which are really pathognomonic or characteristic of the paroxysm. It is only necessary to witness one case of convulsions, with all its frightful cortege of phenomena, to have the impression indelibly stamped upon memory. It is one of those truthful yet terrible portraits, which the medical man, even if he would, will find it difficult to obliterate from recollection.

Imagine, for instance, that you are at the bedside of your patient, administering with kindness and skill to her wants; the labor is progressing favorably, everything looks bright and promising, and, without the slightest premonition, a convulsion commences, ushered in by the following symptoms: The face becomes, as it were, suddenly fixed, with twitchings of its muscles; the whole expression is altered; the eyes at first roll, and then become stationary, usually turned upward; the pupils are dilated, and make no response to the light; the lips are drawn in various directions, and exhibit rapid movements; general distortion of countenance, with tumefaction and a livid hue; foaming of the mouth; protrusion of the tongue; violent pulsation of the carotid and temporal arteries, with marked engorgement of the jugulars; the head, in consequence of irregular action of the muscles of the neck, is usually drawn to one side.

These changes are also accompanied by more or less spasmodic

contraction of the muscles of the arms, while the hands are firmly closed; the lower extremities, on the contrary, are more or less free from movement; as a general rule, there is not much jactitation, so that it does not become necessary to hold the patient to prevent her falling from the bed; the respiration is short and irregular, and sometimes, through contraction of the glottis, momentarily suspended with intermittence of the heart's action. During all this time, there is complete loss of consciousness; occasionally there will be involuntary discharges of urine and feces; the attack is followed by stertorous breathing, the patient presenting the general condition of an apoplectic; after a certain time, the stertor ceases, and consciousness usually returns. There is no fixed rule as to the recurrence of the attacks; they may come on every ten, twenty, forty minutes, and hours may sometimes intervene between the paroxysms. Such, gentlemen, is a brief summary of the principal features which ordinarily accompany an attack of puerperal convulsions, and, as I have told you, once witnessed, they cannot readily be forgotten.

Diagnosis.—It is proper to remember that the nervous system may be variously disturbed during pregnancy, at the time of labor, and subsequently to delivery, and these disturbances may assume one of several phases; for instance, either hysteria,* catalepsy, epilepsy, tetanus, chorea, or the puerperal convulsion of which we have been speaking, may originate at either of these periods; it is needful, therefore, that a just distinction be made in reference to these different grades of nervous perturbation.

In hysteria, consciousness is not lost, nor does either coma or stertorous respiration succeed the paroxysm; there is great restlessness, amounting to violent jactitation, so that, unless the patient be well guarded, she will throw herself from the bed; oftentimes, there is laughing alternating with shrieking; and what is almost always a prelude to the attack, is a sense of constriction of the œsophagus, occasioned by what is known as the *globus hystericus*.

Catalepsy is characterized by one striking peculiarity, viz. *the uniform persistence of position of the limbs during the paroxysm, corresponding with the position in which they were at the time of the invasion.*

I must confess I am unable to present any essential characteristic differences which will enable you to distinguish with positive certainty epilepsy from puerperal convulsions; for I am disposed to regard eclampsia in the puerperal woman as bordering so closely on the true epileptic convulsion as to render a distinction, to say the least, extremely difficult. If there be a difference, it may be said to exist in the coma, which uniformly follows eclampsia, and

* Hysteria, although, as a rare exception, it may occur at the time of labor, much more usually develops itself in the first three months of pregnancy.

which, also, occasionally, but not universally, is a sequela of epilepsy.

The continued rigidity of the limbs is the characteristic feature of tetanus, and leads readily to an accurate diagnosis.

In chorea, the mind is undisturbed, and the affection consists principally in an inability to control muscular movement.

Without some judgment, the practitioner might possibly, if he saw the patient during the stage of coma, confound this condition of things with apoplexy. But all error will be removed by a history of the case; for example, the coma of puerperal convulsions is preceded by the spasmodic and convulsed action of the muscular system; not so apoplexy; and, besides, in this latter affection there would most probably be hemiplegia—the result of the cerebral extravasation. Again: it is well to bear in recollection that, even in convulsions, death will sometimes ensue from effusion of blood in the brain, constituting a veritable apoplexy, and, in such case, there will of course be hemiplegia more or less developed.

Prognosis.—So far as the mother is concerned, the prognosis cannot be said, according to the best observation, to be favorable; and yet I cannot agree with some writers, who maintain that more than one half die. It is, I think, more in keeping with facts to say that, under prompt and judicious treatment, at least 70 per cent. of the mothers are saved. Dr. Churchill states that, in 214,663 cases of labor, convulsions occurred 347 times, or 1 in about 618½. In 328 cases, 70 mothers were lost, or about 1 in 4½. The mortality is much greater among the children; some of these die *in utero* during the paroxysm, and many of course are sacrificed by the operations, which may be judged necessary for the safety of the mother, such as premature delivery, version, the forceps, and the crotchet. It should, however, not be forgotten that our prognosis, in reference to the safety of either mother or child, is to be graduated by the time at which the convulsion becomes developed, its duration, the frequency of its recurrence, the character of the convulsion itself, and the condition of the patient. Occasionally, although death does not ensue, there are some serious consequences resulting from convulsions, such as loss of memory, positive mania,* imbecility; and these may continue for a longer or shorter period. Cases are recorded in which permanent amaurosis and deafness were the results. It is stated by some authors that the great majority of women who survive the invasion of convulsions are attacked with puerperal fever. This certainly does not accord with my experience, nor can I see any other than simply a coincident relation between these two pathological phenomena.

* Mania and other forms of insanity may occur after parturition, even when the labor has not been complicated with convulsions. Esquirol, perhaps the best authority on insanity, says: "The number of women who have become insane after

LECTURE XXXIII.

Puerperal Convulsions continued—Their Centric Causes; divided into *Psychical* and *Physical*; how distinguished. Toxæmia, or Blood-poisoning—Albuminuria, its Relations to Convulsions—Causes of Albuminuria—Ed. Robin's Theory not sustained—A Change in the Composition of the Blood a Cause—Illustrations and Proofs—Secretion, its Objects—A Change in the Kidney, Structural or Dynamic, a Cause of Albuminuria; Proofs—Pressure on the Renal Veins a Cause—Illustration—Albuminuria more frequent in the Primipara; why?—Is Albuminuria a necessary Result of Diseased Kidney?—Does it always exist in Pregnancy?—Uremia, what is it?—Dr. Carl Braun and Uremic Intoxication—Is Albuminuria always followed by Uremia?—Is Urea a Poison?—Carbonate of Ammonia and Urea—Frerichs's Theory—Orfila's Experiments with Carbonate of Ammonia on Animals; Result—Treatment of Uremia, on what it should be based—Therapeutic Indications—*Colechicum Autumnale* and *Guaiacum* as Remedial Agents—Dr. Imbert Goubeyre and Bright's Disease in connexion with Albuminuria—Anæsthetics in Uremia.

GENTLEMEN—In the preceding lecture we have been occupied with a consideration of the *eccentric* causes of convulsions; I propose to-day to speak of those influences which, through *centric* action, are capable so far of disturbing the nervous equilibrium as to occasion the convulsive spasm. The *centric* causes of convulsions are divided into *psychical* and *physical*. Under the former head are included all operations on the mind, known as emotions, so that the depressing passions, such as grief, or the more exciting emotions, such as joy, are to be regarded as among the psychical causes of this affection. The *physical* consist in various pathological conditions of one or other of the two great nervous centres, the brain and spinal cord; for example, plethora, by inducing congestion of these centres, may provoke convulsions; an anæmic state of the system, as has been already explained, may do the same thing; disease of the brain or spinal cord, whether of the substance or coverings, is also a centric cause.

But, gentlemen, there is yet another *centric* agent capable of evoking convulsions, to which I desire especially, and somewhat in detail, to direct your attention. I allude to an impure or poisoned condition of the blood. Until within comparatively a short period, authors were silent on the subject of certain poisonous properties contained in the urinary secretion, or, at least, they did not attach

their confinement is much greater than generally supposed. At the Hôpital Salpêtrière nearly one twelfth of the insane women we received here became so after their delivery." (*Traité des Maladies Mentales*, vol. 1, p. 230.)

to it that specific interest, which late discussions have excited ; and hence the term *toxæmia*, or blood-poisoning, was not employed, as it now is, to denote a very peculiar and important state of the economy. While *toxæmia* is the generic term, there are various species or grades of blood-poisoning.

This question is well deserving of attention, particularly at this time, for it has recently received prominent consideration.* In September, 1853, I published a paper entitled, "*Thoughts on Uræmia*," which was generally distributed among my medical friends in this city, and which is incorporated in my work on the diseases of women and children.† In that paper will be found the following language in reference to one class of puerperal convulsions, and I trust I may be pardoned for quoting it here : "Recently much has been written, and questions proposed by learned academies, respecting the connexion between albuminuria and puerperal convulsions ; and the writers are almost unanimous in the opinion that albuminuria is the cause of these convulsions. Now, I contend that puerperal convulsions are frequently nothing more than uræmic phenomena, as is proved by their causes, symptoms, diagnosis, and pathology. If, then, puerperal convulsions be the result of uræmic intoxication, they are not necessarily produced by albuminuria. There is often a coexistence of puerperal convulsions, albuminuria, and œdema, general or local ; but each one of these conditions may, and has existed irrespectively of the other."

Causes of Albuminuria.—I propose now, as briefly as is consistent with the interest and importance of the subject, to examine the true relation of albuminuria to *eclampsia*, and also the points of relation between this latter and Bright's disease of the kidney. With this view I shall commence with the consideration of the *causes of albuminuria*. Here we find various opinions : Edouard Robin maintains that the passage of albumen into the urine is the result of imperfect combustion ; that urea is produced by the oxygenation of the albumen in the blood, and if the oxygenation do not take place the result will be albuminuria. This hypothesis possesses the attribute of ingenuity, but its demonstration seems to me difficult, for the obvious reason that when albumen passes into the urinary secretion the quantity of urea, as a necessary consequence, should not be increased in the blood. It is, I believe, conceded that, although

* The Uræmic Convulsions of Pregnancy, Parturition, and Childbed. By DR. CARL R. BRAUN, etc., etc. Translated from the German by J. Matthews Duncan, F.R.C.P.S., etc., 1858.

De l'Albuminurie Puerpérale et de ses Rapports avec l'Eclampsie. Par M. LE DOCTEUR A. IMBERT GOUBEYRE. Mémoire Couronné, dans la Séance Publique Annuelle. December, 1854.

† See page 522

albumen does occasionally exist in the urine without a diminution in the fluid of urea, yet the converse of this is very often observed, viz. an increase of urea in the blood coexisting with albuminuria. This, therefore, is in direct conflict with the explanation of Robin. It is stated by Dr. C. I. B. Williams that, *per se*, "albuminuria indicates nothing more than congested kidney." I shall, on the contrary, attempt to show that other causes than simple congestion of the kidney will occasion albuminuria; and, in doing this, it will follow that Dr. Williams's opinion is far too exclusive.

It is quite certain that the presence of albumen in the urine is not traceable to any one influence, for it is recognised under a great variety of circumstances, and I shall endeavor to prove that it is due to one of the following causes: 1. A change in the composition of the blood; 2. A change in the kidney, either structural or dynamic; 3. Pressure on the renal veins.

1. *Change in the Composition of the Blood.*—It was a favorite doctrine of the old-school-men that the blood contained certain deleterious elements, which could not continue in the system without generating disease. This, too, was the opinion of Sydenham, Pitcairn, Cullen, and others; and the master-minds of the present day, with all their supposed progress, are compelled to admit that there is something more than mere conjecture in what was formerly termed the "peccant humors." The organs through which these humors or poisons pass from the economy are called glands; and each gland has its specific office assigned to it—that is, one of these glands furnishes an outlet for one character of material in the blood, and another gland for a different substance. Thus, while the liver is engaged in the secretion of bile, etc., and the kidney water, urea, etc., we find the intestines the media through which effete matters are thrown off. These various offices are performed through what is called secretion, the true nature of which is still involved in mystery. It is true, we understand certain general principles respecting the secreting processes, but it cannot be denied that we are unable to explain many of the phenomena connected with this fundamental law of the physical mechanism. Although, therefore, we are ignorant of some of the processes connected with glandular elaboration in a state of health, yet it does not follow that we cannot explain many of the causes which, interfering with healthy secretion, result in morbid action.

In order to apply this reasoning to the question before us, we will suppose—what will not be controverted—that in a variety of diseases occasionally accompanied by albuminuria, such as cholera, scarlatina, diabetes, etc., the constituents of the blood become changed by the introduction either of a poison or some other substance. If this occur, it is quite manifest that the blood is no

longer normal, and because of its altered condition its elaboration in the kidney will also be modified; so that in lieu of the ordinary elements contained in the urine, we shall sometimes recognise albumen, an absence of urea and other pathological phenomena. May this not be satisfactorily explained on the principle that the product of endosmosis will be modified in proportion to the changes in the fluid on which it acts? Again: the blood is changed in pregnancy, various circumstances tending to this modification, viz. the formation of kiesteine, the secretion of milk, the quantity of blood materials passing through the circulation of the fœtus, together with the diseases of the embryo itself, not to speak of its excretions, some of which we know enter the blood of the mother. These, then, being so many influences capable of altering the constituents of the blood, will they not explain, at least in some instances, the occasional presence of albuminuria in the pregnant female?

2. *A Change in the Kidney, either Structural or Dynamic.*—Every structural change in the kidney may result in albuminuria, but we do not yet comprehend in what essentially these various changes consist. For example, though it may be true that the presence of albumen in Bright's disease, in scarlatina, etc., may be due to a desquamation of Bellini's tubes, yet this cannot be said of many other affections of the kidney in which albuminuria exists, but in which no desquamation takes place. Several interesting experiments have been made to prove that the urinary secretion is not absolutely dependent upon the nervous system by Segalas,* and some of a more decisive character by Dr. Brown-Séquard;† while, on the other hand, it has been satisfactorily shown that the nervous system may, under certain circumstances, exercise a marked influence over this secretion, as is demonstrated by the researches of Brachet, J. Muller,‡ and Marchand. The latter has pointed out a very important fact connected with this subject. He produced in a dog not only all the symptoms of uræmia, after placing a ligature on the renal nerves, but also discovered urea in the blood, and in the matter vomited by the dog.

Kramer is said to have detected albumen in the urine of animals, after dividing the sympathetic nerve in the neck. This, however, seems to need confirmation, as the same result has not followed the experiments of others. Dr. Séquard, after repeated trials, has failed in establishing the fact mentioned by Kramer. Budge found albuminuria after a puncture of the cerebellum; and Cl. Bernard§

* Bulletin des Séances de l'Acad. de Med. de Paris. (Séances des 27 Août et 23 Septembre, 1844.)

† Experimental Researches applied to Physiology and Pathology, Philadelphia, 1852-3. P. 13.

‡ Manuel de Physiol. Edité par E. Littré. Paris, 1851. P. 391.

§ Comptes Rendus de l'Acad. des Séances de Paris, t. xxviii, p. 393.

occasionally obtained the same result from a puncture of the medulla oblongata. In addition, however, to these demonstrations, we have numerous instances occurring in practice illustrating the influence of the nervous centres—when laboring under disease or traumatic injury—over the urinary secretion; and it is quite possible that the irritation of the uterine nerves during pregnancy, and in many of the diseases, both organic and functional, of the uterus itself, may, through reflex action of the medulla spinalis, produce various morbid changes in the urine. Again: it does appear to me that, if it can be proved that sudden emotions, shocks, etc., have an influence on the peculiar processes by which the blood is continually ridding itself of its deleterious materials, we shall, in this way, have opened to us a new field in our investigation of disease; we shall be enabled to elucidate many morbid phenomena which have heretofore been obscure, and, as a necessary consequence, deduce rational therapeutic principles.

3. *Pressure on the Renal Veins.*—Whatever may be the other causes which operate in the production of albuminuria, there is a mass of irresistible testimony to demonstrate the positive influence of an obstructed renal circulation. G. Robinson,* Meyer,† and Frerichs, have abundantly proved that a ligature tied more or less completely around the renal veins will cause albumen to pass from the blood into the urinary secretion; and again when the renal veins have become obliterated, in every instance in which the urine was examined, albuminuria was detected. Cases of this nature have been observed by Dance, Rayer, Dugès, Velpeau, R. Lee, Cruveilhier, Stokes, Blot, Leudet, and others. In gestation, and especially in primiparæ, albuminuria is often caused by pressure of the impregnated uterus on the renal vessels. Dr. Rose Cormack, I think, was the first to call attention to this subject. Dr. Brown-Séquard has positively ascertained the influence of pressure upon the renal vessels, in a lady who had albumen in her urine during the ninth month of pregnancy. He placed her in such a position that the pressure was much diminished, and after a certain time the urine ceased to contain albumen. When the ordinary attitude was resumed, there was soon a reappearance of albumen in the urine.

In 106 multiparæ, Blot detected albuminuria in eleven instances only, while in ninety-nine primiparæ thirty exhibited it. The proportion, therefore, for the former is as one to ten, the latter as one to three. This is a remarkable difference, and must be due to some special cause.‡ It is quite evident that albuminuria is of fre-

* Medico-Chirurg. Transac. of the Royal Med. Chirurg. Soc. of London. 1843. Vol. viii., p. 51.

† Gaz. Med. de Paris. 1844. P. 419.

‡ Women in their first pregnancy present a very different condition of the abdominal walls from those who have already borne children. In the former, these walls

quent occurrence in pregnancy, and oftentimes results in death. Imbert Goubeyre* states that of sixty-five pregnant women attacked with albuminuria, twenty-seven died, five remained albuminuric, and thirty-three were restored from two to fourteen days after delivery. The frequency of puerperal convulsions in albuminuric women is very great. According to the same author, of 159 women laboring under albuminuria, ninety-four were attacked with convulsions.

Cahen† and others have endeavored to show that albumen in the urine is caused by disease of the kidney. It cannot be denied that disease of this organ may coexist with gestation, and in such case the albuminuria may be traced to a morbid condition of the gland; but to say that albuminuria cannot exist in pregnancy other than as a result of disease of the kidney is in direct opposition to well-established observation.‡

As a point of diagnosis, it may be incidentally mentioned that when albuminuria in pregnant women is caused by Bright's disease, there is frequently some degree of amblyopia§ and even amaurosis, while in simple albuminuria produced by pressure of the womb on blood-vessels, the retina preserves its functions. M. Lécorchè, a

are firm and resisting; in the latter, on the contrary, they are relaxed, and have lost much of their original tension. For this reason, in primiparæ the impregnated uterus is more perfectly in the line of the axis of the superior strait of the pelvic canal; while in multiparæ, the organ is disposed to fall forward, constituting ante-version, more or less, of the fundus. Precisely in proportion, therefore, to the inclination of the uterus forward from the direct line of ascent will be the probability of diminished pressure on the renal circulation. I believe, also, there is another reason why albuminuria is observed less frequently in multiparæ than in primiparæ. It is a well-known fact that women are much more disposed to miscarry in a first than in subsequent pregnancies; and, *caeteris paribus*, this is no doubt owing in a measure to the greater irritation of the uterine nerves consequent upon a first gestation. May not, therefore, this excess of irritation, by modifying the urinary secretion, be occasionally a cause of the more frequent presence of albuminuria? I think so; and again, when, under these circumstances, the passage of albumen into the urine is followed by urea in the blood, as is often the case, even admitting that full uremia does not take place, may not the nervous system become so much disturbed by the presence of urea as to induce premature action of the uterus, and consequently miscarriage? If there be any force in this reasoning, the preventive treatment of miscarriage in this condition of system may prove far more successful than it has heretofore been.

* *Mémoires de l'Académie Impériale de Médecine*. Tome xx. 1856.

† *De la Néphrite Albumineuse chez les Femmes Enceintes*. Thèse, Paris, 1847.

‡ Blot demonstrates the fact as follows: 1. The rapidity with which albuminuria disappears after delivery in almost every case, very often in two or three hours, sometimes in one, after the expulsion of the child. 2. Absence of the symptoms of diseased kidney. 3. Certain characters of the urine entirely different from those of Bright's disease, as for instance, increase in its density, and the presence of more salts, and particularly urates. 4. In seven women who died, and in whom albuminuria had been detected, only three had slight pathological alterations in the kidney. [*De l'Albuminurie chez les Femmes Enceintes*. Thèse, Paris, 1849.]

§ From *αμβλος* dull, and *ωψ* the eye.

pupil of Rayer, gives a table, showing that in 332 cases of Bright's disease, there was either amblyopia or amaurosis in 62 instances. The coexistence, therefore, of this symptom with albuminuria in the pregnant female should be regarded as grave.

The opinion is now well settled, and concurred in by a great majority of writers, that albuminuria is, in many cases, simply the result of an active or passive congestion of the kidney. Anything, therefore, capable of obstructing the renal circulation, whether it be an enlarged uterus from pregnancy or disease, an ovarian tumor, or enlargement of the abdomen of any kind, may be enumerated among the causes of albuminuria. Christison, Rayer, and others maintain that the diminution of urea in the urine, and consequently its accumulation in the blood, is in proportion to the quantity of albumen, but this does not appear to be invariably the case; for Bence Jones has recorded an instance of *mollities ossium*, in which he presents an analysis of the urine, showing that albuminous matter may exist in great quantity, while the amount of urea remains perfectly natural.

*Is Albuminuria always followed by Uræmia?**—That the presence of albumen in the urine is not necessarily followed by uræmia is amply proved by observation; and it is important that this fact should be well understood, for the reason that much error has arisen from the opinion entertained by certain writers, that there is a direct connexion between uræmia and albuminuria. This error is not so much owing to any inherent difficulty of the subject, as it is to that loose appreciation of facts, or, more properly speaking, to that want of healthy digestion of well-settled principles which, unfortunately, too often characterizes the writings of professional authors. I might cite a long list of observers to show that albumen very frequently exists in the urine without any development of uræmic intoxication, but I apprehend this would be unnecessary. I shall, therefore, limit myself to two or three undoubted references. Franz Simon, for example, says he has frequently detected albuminuria in

* It is important, in connexion with the subject under consideration, that the term uræmia should be clearly understood. Uræmia consists in disturbed action of the two nervous centres—the brain and spinal cord—producing either coma, partial, or complete convulsive paroxysms; the disturbances being directly traceable to the action of a peculiar poison on these nervous centres. They may be affected separately or together; and hence, according to Carpenter, there may be three forms of uræmic poisoning: 1. A state of stupor supervenes rather suddenly, from which the patient is with difficulty aroused, soon followed by complete coma, with stertorous breathing, etc., as in ordinary narcotic poisoning; 2. Convulsions of an epileptic character, often affecting the entire muscular system, suddenly occur, but without loss of consciousness; 3. Coma and convulsions may be combined. The existence of uræmia has been differently explained by authors; for example, some contend that it is due to albumen in the urine, others that it is caused by urea in the blood, while again both of these opinions have been rejected, and a new one advanced by Frerichs, viz. that uræmia results from the transformation of urea into the carbonate of ammonia.

persons apparently in the enjoyment of good health; also others have observed it in articular rheumatism, in inflammation of the thoracic organs, intermittent and typhus fevers, in measles, cholera, and in chronic affections of the liver. In transitory renal catarrh, such, for instance, as occurs in erysipelas nearly as often as in scarlatina, albumen, together with the well-known epithelial cylinders of Bellini's ducts, is found as constantly in the urine as in inflammatory affections of the kidneys, where it exists in connexion with the fibrinous plugs from the same ducts, as in true Bright's disease.*

Edouard Robin says "the urine becomes albuminous in croup, in ascites, and in cases of capillary bronchitis, with emphysema, accompanied by dyspnœa; in pulmonary phthisis, in gestation when sufficiently advanced to occasion a habitual congestion of the kidneys; in cyanosis, diabetes, etc., etc."†

In order to prove that albumen may exist in the urine independently of any disease of the kidney, and without any of those nervous disturbances characteristic of uræmic intoxication, Dr. M. T. Tegart mentions the following interesting and conclusive experiment upon himself, and also confirmed in the person of one of his friends: He made for some time a portion of his ordinary nourishment to consist of half a dozen eggs, and albumen, as a consequence, was soon detected in the urine.‡ Similar experiments have been made with similar results, by Bareswil, Cl. Bernard, Brown-Séquard, and Dr. Hammond of Baltimore.

There are few practitioners of careful observation, who will not endorse these statements. Indeed, I consider the principle to be so well established that the existence of albuminuria is not necessarily connected with uræmia, that further citations can scarcely be necessary to demonstrate the fact.

Is Urea a Poison?—Urea was, I believe, first discovered in 1771, by Rouelle, who detected it in the urine. It owes its present name, however, to Fourcroy and Vauquelin. It was obtained pure for the first time by Dr. Prout in 1817. There is an interesting circumstance connected with this production—it is the first instance known of an organic compound being artificially produced, and this was accomplished by Wöler from cyanic acid and ammonia.

The true action of urea is variously described by authors, the general opinion being that it is a poison. Todd,§ Williams,|| Cormack,¶ Simon,** and others regard it in this light, and contend that

* *Physiological Chemistry*. By Lehmann. T. i., p. 345.

† Ed. Robin, *London Lancet*, January 24, 1852, p. 96.

‡ "Thèse sur la Maladie de Bright." Paris, 1845. *Gazette Medicale, Paris*, 1846. p. 39.

§ *Lumleian Lectures*, in *London Med. Gaz.* 1849–50

|| *Principles of General Pathology*.

¶ *London Journal of Medicine*. 1849. Pp. 690–699.

** *Lectures on General Pathology*, Amer. Edit., p. 151.

its presence in the blood will occasion coma, convulsions, and other nervous phenomena. Indeed, it may be said that this has been the general opinion; it is proper, therefore, that this opinion be examined. If urea be a poison capable of producing convulsions, etc., the numerous experiments made on living animals in no way establish the fact. Among others, Prevost and Dumas,* Segalas, Tiedeman, Gmelin, Mitscherlich, Cl. Bernard, Bareswil, Stannius,† and Frerichs, have extirpated the kidneys, and have never known convulsions to ensue. This, it may be urged, is only negative proof. Negative, however, as it is, it must be admitted that it is testimony not without value; and to it may be added the interesting experiments of Bichat, Courten, Gaspard, Vauquelin, Segalas, Stannius, Bernard, Brown-Séquard, Frerichs,‡ and others, who, after injecting into the veins urea and urine, never in a single instance observed a case of convulsions. Again: Bright, Christison, Rees, and Frerichs have cited cases in which a large quantity of urea existed in the blood of man unaccompanied by any of the symptoms of uræmia; and Frerichs says, in one instance, in which he detected the greatest amount he had ever observed, there was no approach to uræmic disturbance. Vauquelin and Segalas, so far from regarding urea as a poison, have proposed to administer it as a diuretic. Some recent experimenters, however, especially Dr. Hammond and Mr. Gallois, affirm that they have observed convulsions in rabbits after the injection of urea into the veins. But there is no proof that it was the urea itself which caused the convulsions, and not some other principle resulting from decomposition of the injected substance.

The conclusions, therefore, from these facts appear irresistible that urea, to say the least, is not a virulent poison; its excess in the blood will not *per se* produce uræmic intoxication, nor will it explain the numerous phenomena which are so frequently found to accompany its presence in the circulation. It was in view of all these circumstances that Frerichs attempted to demonstrate that uræmia depended neither upon a diminished quantity of urea in the urine, nor upon an excess of the substance in the blood, nor upon albuminuria; *but that it is traceable solely to carbonate of ammonia in the system, which, he says, is formed through the agency of a ferment from the urea itself.* In other words, *Frerichs's doctrine is, that uræmia is exclusively due to the transformation of urea into the carbonate of ammonia.* The *modus in quo*, however, of this transformation is not clear; there is no proof as to the manner in which it is accomplished; but the major point, viz. *dependence*

* Annales de Chimie et de Physique.

† Gaz. Med. de Paris. 1841. p. 168.

‡ Die Bright'sche Nierenkrankheit, 1851. Analysed in Braithwaite's Retrospect, 1852. Part xxv., p. 135.

of uræmia on the presence of the carbonate of ammonia, seems to rest on strong and cumulative testimony.

Many years ago, Orfila produced convulsions in an animal by giving it, internally, the carbonate of ammonia; the animal, after becoming convulsed, died. Brown-Séquard has published the following facts in Tessier's dissertation *Sur l'Urémie*, Paris, 1856: Carbonate of ammonia injected into the stomach does not poison; it is absorbed slowly and passes off through the lungs with carbonic acid. If, on the contrary, it be injected in a certain amount into the blood, it has time to act on the nervous system, and to cause convulsions before it is expired.* Cl. Bernard and Bareswil have detected carbonate of ammonia in the stomach and intestines of animals after the removal of the kidneys; and Lehmann has also observed it in the matter vomited by patients affected with cholera. Christison, Jaksch, and others, have recognised, under certain circumstances, an ammoniacal odor in the blood.

Until, however, the exposition of the peculiar views entertained by Frerichs as to the true cause of uræmic intoxication, no significant value was attached by authors to the presence of the carbonate of ammonia in the exhalations. Frerichs states that he has ascertained, through chemical analysis, the existence of this salt in the blood in all cases in which the symptoms of uræmia are developed; but its true quantity is subjected to considerable variation. He further remarks that the two following propositions he has proved beyond a doubt: 1. *That in every case of uræmic intoxication, a change of urea into carbonate of ammonia takes place*; 2. *That the symptoms which characterize uræmia can all be produced by the injection of carbonate of ammonia into the blood*. After citing many experiments to fortify his opinion, he says he has frequently detected the alkaline salt in the expired air of animals deprived of their kidneys, and into the veins of which he had injected urea; these animals remained quiet and awake as long as the expired air was not impregnated with the ammonia; but the moment the latter was observed, the various disorders of the nervous system characteristic of uræmic poisoning developed themselves. These views of Frerichs will necessarily tend to the settlement of a vexed question, which has called forth the ingenuity of both the physiologist and chemist. It may, however, be that the future will reveal the existence of other poisonous materials in the blood which, to the present time, have eluded observation; and, in their recognition, we may find additional causes for the production of toxæmia. It has, indeed, been suggested that, in Bright's disease, the accu-

* Many facts have recently been developed in France, proving that the phenomena of uræmia must be due to some kind of poisoning. It has been shown by Fiboret, Tessier, Picard, Rilliet, and Barthez, that in patients who have died from uræmia, there is no organic lesion of the nervous centres.

mulation of oxalic acid in the blood will develop the symptoms of uræmic intoxication.

I may here remark that Braun attributes the death of children to the same cause as that of the mothers in cases of puerperal convulsions from uræmia, viz. to poisoning by carbonate of ammonia, *which poison is found in the fetal blood.*

*Treatment of Uræmia.**—This necessarily involves two objects: 1. The immediate restoration of the principal eliminators of the system, such as those of the kidney, skin, and bowels, with a view of diminishing, through these outlets, the quantity of urea and noxious elements, which may exist in the blood; 2. The protection of the nervous centres, as far as may be, against the injurious effects of the carbonate of ammonia.

In our therapeutic management of uræmia, it is important to remember that the skin contains an immense number of glands which, anatomically speaking, are similar to the corpuscles of Malpighi in the kidney, and which glands secrete water, urea, and salts. The various remedies, therefore, known to increase the cutaneous secretion should be employed in cases of uræmic poisoning. With a view of neutralizing the carbonate of ammonia in the blood, Frerichs has strong faith in benzoic acid, in doses of five or ten grains, together with iced acidulated drinks.

Anæsthetics in Uræmia.—Chloroform and sulphuric ether have been repeatedly employed in these cases with very favorable results; and I believe the credit is due to Prof. Simpson of an ingenious explanation of the mode of action of these agents in uræmic poisoning. Availing himself of an important fact pointed out by the chemists, that chloroform produces a temporary diabetes mellitus, causing, of course, the appearance of sugar in the urine, and, perhaps, also in the blood; and that the addition of a little sugar to urine *out of the body*, prevents for a time the decomposition of its urea into carbonate of ammonia, the distinguished Professor suggests that the efficacy of anæsthesia in restraining and arresting the convulsions may be upon the ground of its preventing this decomposition.†

* Dr. MacLagan, of Edinburgh, has drawn attention to the value of the *colchicum autumnale* in uræmic poisoning. The excellence of this remedy consists in its power of increasing the amount of urea in the urine. This fact, I believe, was first discovered by Chelius, of Heidelberg. Professor Krahmer, of Halle, has made some very interesting experiments on the subject of diuretic medicines. According to him, the average of urea secreted during the day in healthy urine is 19.64 grammes, while the tables of Becquerel give 16 grammes. Krahmer has shown that, under the influence of colchicum, the urea is increased to 22.34 grammes, and under the administration of guaiacum to 22.74 grammes. From the experiments of Krahmer, therefore, it appears that colchicum and guaiacum produce a greater secretion of urea than any known remedies. Dr. Hammond (*American Journal of Med. Sciences*, 1859, p. 275) has also tested the superiority of colchicum over several other diuretics.

† Simpson's *Obstetric Works*, vol. vi. p. 827.

Conclusions.—From what has been said, it appears to me the following conclusions may be fairly deduced:

1. Disease of the kidney will often produce albuminuria, but in a large number of cases albuminuria exists without true disease of the gland, as a consequence of an active or a merely passive congestion, and it will also result from a variety of nervous disturbances.*

2. Albuminuria is often connected with uræmia, but is not the cause of it.

3. Uræmia is a nervous disturbance arising from a peculiar blood-poisoning.

4. If urea be a poison, the quantity of it which accumulates in the blood in cases of extirpation of the kidneys in animals, or in suppression of urine in man, is not sufficient to produce any manifest deleterious effect.

5. According to Frerichs, uræmia is merely a poisoning by the carbonate of ammonia, which is a product from the decomposition of urea.

6. The treatment of uræmia must consist in the free use of diuretics, sudorifics, and purgatives; the most suitable diuretics for this purpose being colchicum and guaiacum.

* Dr. Imbert Goubeyre (Mémoires de l'Académie Impériale de Médecine, tome xx.) maintains that there is a *puerperal albuminuria*, and that it is symptomatic of, and nothing other than Bright's disease of the kidney; that there is a *puerperal Bright's disease*, as there is a *puerperal peritonitis*, etc. He also contends that *puerperal eclampsia* is actually *puerperal Bright's disease*, in which convulsions occur: in other words, that the eclampsia is but a symptom of albuminous nephritis, or Bright's disease. Dr. Carl R. Braun (Uræmic Convulsions of Pregnancy, Parturition, and Childbed) defines uræmic eclampsia as follows: "Eclampsia puerperalis is an acute affection of the motor functions of the nervous system (an acute neurosis of motility), characterized by insensibility, tonic and clonic spasms, and occurs only as an accessory phenomenon of another disease, generally of Bright's disease in an acute form (diabetes albuminosus, nephritis diffusa seu albuminosa), which, under certain circumstances, spreading its toxæmic effects on the nutrition of the brain and whole nervous system, produces those fearful accidents." If, then, we are to be guided by the statements of these two distinguished writers, and accept their opinions on this question, we must believe that when *puerperal eclampsia* occurs it does so as the effect of Bright's disease of the kidney. From this hypothesis, too, it should follow that there will be a constant relation between Bright's disease and albuminuria, and also between that affection and eclampsia. But such is not the fact; for it has been shown that albuminuria may exist without structural alteration in the kidney, and also that the various forms of Bright's disease may be present without the detection of albumen in the urine. (See Begbie, Brit. For. Med. Chirurg., vol. xii., p. 46.) Again: acute Bright's disease is not always accompanied by uræmia and eclampsia; in 100 cases of Bright's malady, only from 60 to 70 were affected with uræmic eclampsia; and another extremely important fact is this—Bright's disease is not uniformly recognised in instances of fatal eclampsia. This latter circumstance is to my mind a very decided negative to the necessary relation between Bright's disease and uræmic convulsions.

LECTURE XXXIV.

Manual Labor—Version, divided into Cephalic, Podalic, Pelvic, and Version by External Manipulation—Diagnosis of Manual Labor; important that it should be made early—Prognosis, how it varies—Indications of Manual Delivery; in what they consist—Time most suitable for Termination of Manual Delivery—Undilated Os Uteri, means of overcoming—Mode of Terminating Manual Delivery; the various Rules to be observed—Divisions of Manual Delivery—Rules for correcting Malpositions of the Head—What are these Malpositions, and how do they Obstruct the Mechanism of Labor?

GENTLEMEN—Your attention having been directed to the various causes of manual interference for the termination of delivery, you are now prepared for the discussion of the question—*in what way is manual labor to be accomplished?* Before, however, entering upon the particulars of this interesting subject, it will be proper to make one or two preliminary observations touching *version*, or, as it is sometimes termed—*turning*. This operation consists in bringing down to the superior strait one or other of the obstetric extremities of the fœtus, and hence it is divided into *cephalic*, *pelvic*, and *podalic* version; in addition, there is version by *external manipulation*. In the former case, the head is brought to the strait; in pelvic version, the nates or breech; in podalic, the feet; while in external cephalic version, of which we shall more particularly speak hereafter, an attempt is also made to bring the head down.

Cephalic Version.—In the earliest periods of our science this was the only kind of version adopted; indeed, Hippocrates and his contemporaries speak of no other, turning by the feet being in no way alluded to by them, and consequently it must not only not have been practised, but altogether unknown. It was not until the sixteenth century that version by the feet was commended to the attention of the profession, as a substitute for version by the head; and although writers generally refer the credit of the suggestion to Paré and his pupil Guillemeau, yet it is but just to say that Franco preceded them both in the suggestion.* Guillemeau was the instrument in the seventeenth century of spreading the new view, and it was soon adopted by Mauriceau, the great obstetric authority of that age. From that period to the present, podalic version has been very generally adopted, while, at the same time, it must be

* Franco was the first to describe and recommend version by the feet, which he did in his *Traité des Hernies*, in 1561.

admitted that version by the head has found its advocates even in our own times.*

Let us now proceed to discuss the general question of *manual labor* under the following heads; and, in doing so, I shall endeavor to present the whole subject in the most practical manner: 1. *The Diagnosis*; 2. *The Prognosis*; 3. *The Indications*; 4. *The time most suitable for its termination*; 5. *The mode of terminating manual labor*; 6. *Its various divisions*.

1. *Diagnosis of Manual Delivery*.—It has already been stated—and it is important to recollect the fact—that the introduction of the hand into the uterus, or, in other words, manual interference, can only be useful either in cases of malposition of the fœtus, or in the event of the supervention during labor of certain accidents, such as hemorrhage, convulsions, etc., all of which accidents we have fully discussed. It, therefore, is manifest that the duty of the accoucheur, when at the bedside of his patient, is to ascertain whether the relation of the fœtus to the pelvis be such as to enable nature, through her own resources, to accomplish delivery; or whether, in consequence of malposition, it will devolve upon him to render assistance. For example, if he should find the head at the superior strait, the question for him to determine is, does it present naturally? If, on the contrary, one of the pelvic extremities, either the breech, knees, or feet, should be there, is the position in accordance with the requirements of nature? And again, should it be a cross-presentation of some portion of the trunk, necessarily involving the propriety of version, its exact position should be ascertained with a view of proceeding to delivery.

It may, however, be that, so far as the presentation and position of the fœtus are concerned, everything is perfectly natural, yet the occurrence of hemorrhage, convulsions, or some other complication, may render necessary manual delivery. As to the propriety and time of having recourse to this alternative, the peculiar nature of the case and its exigencies must determine. Is there any special period more favorable than another for the vaginal exploration necessary to ascertain the true position of the fœtus? There is undoubtedly—and that period is *as soon as possible after the rupture of the membranous sac*, for then the parts are more or less relaxed, and fitted to facilitate the object in view. It may be considered, as a very general rule, that the difficulty of arriving at a correct diagnosis with regard to the presentation, position, etc., and more particularly the difficulty of either changing a malposition

* A late writer, Dr. A. Mattei, is quite enthusiastic on the subject of cephalic version; he says he invariably adopts it in preference to podalic, unless there should be some insuperable obstacle; and he expresses his belief that cephalic will soon entirely supersede podalic version. [*Essai sur Accouchement Physiologique*. Par A. Mattei. Paris, 1855. P. 183.]

into a natural one, or of accomplishing version, will be *enhanced in proportion to the period which has elapsed since the escape of the liquor amnii*; for when this takes place, the fetus is embraced more closely by the uterine walls; the contractions as a consequence become more energetic, and the presenting part undergoes such intense pressure as oftentimes to render its recognition extremely difficult. Therefore, gentlemen, I cannot too emphatically impress upon you that there is a period of election for this kind of exploration, and if you will treasure the fact in memory, it will frequently aid you in rendering signal service to both mother and child.

2. *Prognosis of Manual Delivery.*—When we consider the consummate skill displayed by nature—if not contravened—in the expulsion of the child from the cavity of the uterus, and the safety with which it is accomplished, we cannot be surprised that this safety is necessarily greatly diminished when manual delivery is had recourse to; for science, however matured and complete, cannot equal the triumphs of nature, when undisturbed by adventitious influences. And again, in a case of fearful hemorrhage, where the powers of the system are near exhaustion, or in convulsions, when it becomes necessary, as the only alternative, to proceed to artificial delivery, the chances of life either to mother or child, from all these circumstances, are evidently diminished if compared with a natural parturition. Even the adjustment of a malposition, with a view afterward of submitting the termination of the delivery to the resources of nature, will, to a certain extent, compromise more or less the safety of the mother and child, and the operation of version itself is by no means without its dangers, as I shall more particularly mention when speaking of the manner of performing it.

Therefore, in all cases of manual interference, it is a duty you owe your patient, yourselves, and science, to exercise a frankness worthy of the noble profession you are pursuing, and to acquaint, not the patient herself, but the husband and friends more immediately interested in her welfare, that what you propose doing, although it is an alternative fully justified by the circumstances, will involve in a certain degree of hazard both mother and child. In this honorable and high-toned course you lose nothing, but will gain much; for, besides the approbation of your own conscience, you will establish a reputation for candor and honesty—two essential attributes in the character of a physician, and which will always yield a handsome interest, so far as public patronage is concerned; and, after all, it is public patronage which a medical man most needs; but never let it be purchased at the cost of truth.

3. *Indications of Manual Delivery.*—The indications of manual delivery are not always identical; for example, in one case there may be simply a malposition of the head, such as the presentation of the occipital or parietal regions; this malposition may oftentimes

be corrected by the timely and skilful manipulations of the accoucheur, and the termination of the labor left to nature; again, it may be that flexion of the head has not taken place, rendering its descent into the pelvic cavity physically impossible; here, the accoucheur by opportune interference may cause the necessary flexion, and thus remove the obstacle; should the occiput remain at one of the sacro-iliac symphyses, it should be brought to either one or other of the acetabula, with a view of curtailing the duration of the labor, thus shielding both parent and child from the dangers of a protracted parturition.

In a presentation of the breech, knees, or feet, it may also become necessary to have recourse to manual interference under either of the following circumstances: 1. In case the labor should be complicated with any of the accidents to which we have alluded, placing in peril the life of the mother or child, and, therefore, rendering immediate delivery essential. 2. If either of these extremities of the fœtus should present at the superior strait irregularly; for example, in the presentation of the feet, or knees, if one foot or knee should be so situated at the strait as to resist the contractile efforts of the uterus. Again: in a head presentation it may become necessary to terminate the delivery by bringing down the feet, thus accomplishing the version of the fœtus; and, also, when any portion of the trunk presents, the alternative, under ordinary circumstances, will be version. I am thus particular, gentlemen, in the details of the indications of manual delivery, in order that you may at once appreciate the necessity of sound judgment and just discrimination in the management of these various forms of preternatural labor.

4. *Time most Suitable for the Termination of Manual Delivery.*—One of the fundamental principles in midwifery, which should be constantly borne in recollection, is—that *nothing will justify a forcible entrance into the cavity of the uterus*; therefore, if the mouth of the organ be not so dilated or dilatable as to permit the introduction of the hand *without violence*, the operation should, under no circumstances, be attempted. So you perceive, the most suitable time for the accomplishment of manual delivery is as soon after the rupture of the membranous sac as possible; or before the rupture, provided the os uteri be sufficiently dilated or dilatable, for at either of these periods the organ will be in a condition more or less favorable to the artificial termination of the labor. Suppose, however, that manual delivery be indicated, and, either from the length of time which has elapsed since the escape of the liquor amnii, or from other causes, the mouth of the organ should be so firmly contracted and rigid as to preclude the possibility of introducing the hand, what, under these circumstances, is to be done? Are you to allow the patient to sink, or the child to be sacrificed,

without an effort to save them? Here, you will have recourse to those agents best calculated to promote relaxation.

If the patient be plethoric, your great remedy will be the lancet; should blood-letting be inadmissible, tolerant doses of tartar emetic or ipecacuanha—the former is preferable because more reliable—will be found essentially serviceable. Warm emollient injections into the vagina will also, in these cases, oftentimes have the happiest effect; and if it can be resorted to without too much inconvenience to the patient, the warm hip-bath, or merely sitting over the vapor of hot water, may result most beneficially. I have on several occasions found this latter very efficient. Here, too, you will have an important auxiliary in the belladonna ointment 3 j. of the extract to 3 j. of adeps. Let it be freely applied to the mouth of the uterus.* It is well to remember that, as exceptions to the general rule, cases will occasionally be met with in which the os uteri will be in a state of complete relaxation, although the rupture of the sac and escape of the waters have occurred several hours previously.

5. *The Mode of terminating Manual Delivery.*—The rules to be observed in all cases in which manual interference is called for are few and simple, and should be faithfully carried out. It is, I am quite sure, to the neglect of these rules that we are to refer many of the unfortunate results too frequently succeeding manual labor. The rules are as follows:

(a) As soon as the accoucheur has decided upon the necessity of interference, he should acquaint his patient with the fact; and, in doing so, care should be taken not to alarm her by the slightest intimation of any danger involved in the operation. The probabilities of the result should, on the contrary, as has already been remarked, be stated frankly to the husband and friends.†

* It will sometimes happen that the os uteri resists all the means just indicated, and it will, therefore, in cases of urgent necessity, be proper to have recourse to what is known as artificial dilatation; this is to be effected in one of two ways, either through the agency of the fingers or an instrument. For the former purpose, one or two fingers may be cautiously introduced into the os, which will act both mechanically and physiologically in the accomplishment of the object. But when the safety of the mother or child depends upon a prompt dilatation, I should, in such an emergency, prefer incising the os uteri; the operation is without danger, and usually followed by rapid dilatation. In saying this, however, I would caution you against having recourse to it except in instances of full justification. The operation is performed as follows: the patient, on her back, is brought to the edge of the bed, one or two fingers are then introduced into the vagina, as far as the os to serve as a guide for the probe-pointed bistoury, with which four or five small incisions are to be made in the anterior and posterior lips. Should hemorrhage follow—a very rare circumstance—injections of cold water or small pledgets of lint will readily arrest it.

† Some excellent authorities recommend, when it becomes necessary to have recourse to artificial delivery, whether manual or instrumental, to do so without communicating the fact to the patient. In my opinion this is bad advice, and should

(b) The patient should be placed crosswise, the bladder and rectum having been previously emptied, with her hips brought to the edge of the bed. I much prefer her to be on her back,* although many recommend that she should rest on her left side. If on the back, a fold of blanket to be placed under the hips, to prevent their sinking into the bed. The legs flexed at a right angle with the thighs, and held by two assistants as follows: let the left hand of the assistant on the right side be placed on the knee of the patient, and with the right hand in a state of supination placed on his lap, the assistant should take hold of the foot of the patient, holding it steadily during the operation. Precisely the same thing should be done by the assistant on the other side, with the exception that he should place the right instead of the left hand on the knee, and grasp the foot with the left. The accoucheur is to be seated between the assistants.

(c) The choice of the hand. This is important, for it will have much to do with the success of the operation. In all cases in which the feet present, the hand should be introduced corresponding with the heels of the fœtus; when the knees present, the hand corresponding with the tibiæ; and in a breech presentation, the hand which corresponds with the posterior surface of the thighs. In a head presentation, the hand corresponding with the face, for the purpose of giving the natural curve or flexion to the body during the operation of version. In all other presentations, the hand corresponding with the point of the uterus at which the feet are situated.

(d) The hand not introduced into the uterus should be applied to the abdomen, with a view of steadying the organ during the manipulation.

(e) The hand to be well lubricated with oil, fresh lard, or some mucilaginous material; and, in case of version, the coat should be removed and the shirt sleeve rolled high up on the arm, care being taken also to anoint the latter. The accoucheur should be provided with an old sheet or apron for the purpose of protecting his dress.

never be followed. The adroit practitioner, who possesses the confidence of his patient, can always obtain her consent to submit to whatever his judgment may deem proper. Besides, see in what a painful position he might possibly place himself by attempting the operation without having previously admonished her of its necessity. In his attempt to act clandestinely, there would be more or less risk of rupturing the uterus, to say nothing of injury to the child, through the movements of the mother as soon as she became cognizant of what was going on. •

* I have on two occasions been obliged to deliver patients by version in a position not altogether convenient to them, but which greatly facilitated the operation—allowing them to rest on their elbows and knees. In both of these instances I had recourse to this position for the reason that the feet of the fœtus corresponded with the anterior wall of the uterus. It will be at once seen how efficiently the position of the patients removed the embarrassment of the version.

(*f*) The hand to be introduced with fingers and thumb gathered in a conoidal form, and the time of a pain to be selected in carrying the hand into the vagina; it should at first be introduced from before backward, then the elbow should be gently depressed, and the fingers given an upward direction parallel to the axis of the superior strait; but the hand should not be made to enter the uterus *except during an interval of pain*.

(*g*) When the hand is introduced, it should pursue that portion of the fœtus corresponding with the posterior plane of the uterus, and in this way the difficulty will be avoided of confounding the shoulder with the hip, the elbow with the knee, or the fingers with the toes.

(*h*) As soon as the hand has reached the feet, one or both should be gently seized, and, *in the absence of contraction*, brought down to the superior strait.

(*i*) The version of the fœtus should be made during freedom from uterine contraction, and the patient desired not to bear down or employ any effort until the feet are beyond the vulva. The operation to be performed with great caution, "*Tarde et secure*"—slowly and securely being the governing principle in these cases.

6. *Divisions of Manual Delivery*.—It seems to me that the multiplied divisions made by most authors of manual delivery can have no other effect than that of confusing the mind of the student, and wearying the patience of the practitioner. The great object in teaching, I maintain, is to simplify as far as it may comport with the nature of the subject discussed, so that the chief end of all instruction may be accomplished, viz. to be useful. With this view, therefore, I shall present to you the following classification or divisions of manual labor, which, while they will embrace every practical indication that may arise in the lying-in room, will, I trust, commend themselves to your appreciation because of their liberation from unnecessary and complicated details. I am quite sure that the numerous refinements, if I may so term them, into which writers enter in their varied divisions not only lead to confusion, but so perplex the reader as to cause him to despair of understanding them. To obviate, therefore, this difficulty, and with a view of exhibiting this important subject in a manner so simple and tangible that all may appreciate and comprehend it, I submit the following classification of the circumstances in which it may become necessary to have recourse to manual interference:*

First Division, embracing head presentations, and exhibiting two varieties; in the first variety, simple adjustment of the head from a malposition becomes necessary; or when this cannot be accomplished, version must be had recourse to; in the second vari-

* The classification I propose is somewhat kindred to the one adopted by my old master, Capuron, but I think is more simplified.

ety, version is indicated, in consequence of the occurrence of hemorrhage, convulsions, or other complications.

Second Division, embracing pelvic presentations, viz., the breech, knees, and feet; this division also exhibits two varieties; in the first variety it may be necessary to interpose because of malposition; in the second, interference is called for because of the complication of some accident, rendering immediate delivery necessary.

Third Division, embracing trunk presentations, including those of the shoulder and arm.

We shall now proceed to indicate in what way adjustment is to be effected in the following positions of the head, embraced in the first division of our classification, viz., 1. Occipital region at the superior strait; 2. Either the left or right lateral region; 3. When the head is not flexed; 4. In occipito-anterior positions, where rotation is not effected; 5. In occipito-sacro-iliac or posterior positions, where rotation is not effected.

First Division.—1. *Manual Delivery when the Occipital Region presents*.—The occipital region may present at the superior strait as follows—and, in either case, it will be physically impossible for the head to descend into the pelvic cavity without a change of position: 1. The neck of the fœtus corresponds with the left acetabulum, while the vertex is in apposition with the opposite sacro-iliac symphysis; 2. The neck regards the right acetabulum, and the vertex the opposite sacro-iliac symphysis. 3. The neck is at the right sacro-iliac symphysis, the vertex at the left acetabulum; 4. The neck at the left sacro-iliac symphysis, the vertex at the right acetabulum.

With a little reflexion, and bearing in memory what we have said respecting the fundamental conditions on which is based the mechanism of natural delivery, it must be quite manifest that, in either of these positions of the occipital region, there is an urgent necessity for prompt interference on the part of the accoucheur. It is in cases like these, in which the proper time for action being permitted to pass unimproved, that we find so much of disaster in the lying-in room. Here, for example, the contractions of the uterus—no matter how vigorous—could prove of no possible avail in accomplishing the delivery, for the reason of the physical disproportion, caused altogether by the malposition, between the head and maternal pelvis. Therefore, with a continuance of the uterine effort, and no adjustment of the abnormal presentation, the death of the child would be certain; and fortunate would it be for the mother, if she too were not sacrificed, from either exhaustion or rupture of the uterus! Let me then, in connexion with the case under consideration, again enjoin upon you the necessity of early acquainting yourselves with the true condition of things, so that your interposition may be opportune. Delay in arriving at an accurate diagnosis is

oftentimes, in these and kindred instances of disproportion between the organs of the mother and the presenting portion of the fœtus, the cause of embryotomy or other operations, which would not have been called for if a proper degree of vigilance had been exercised.

Supposing, then, that a careful vaginal examination should disclose the fact that the occipital region of the child's head presented at the superior strait, the accoucheur will be compelled to do one of two things: either to adjust the head by placing it in a normal position, or, if this cannot be done, he must resort to version. The proper time for adjusting the head will be when the parts are soft and relaxed, and the head consequently more or less movable; for this purpose the hand should be introduced, as already indicated, and the vertex brought in proper position with the strait; this being accomplished, should no accident intervene to render immediate delivery necessary, the termination of the labor may be committed to the efforts of nature. If, however, it become impossible to right the head, either by the hand or lever, the course to be pursued is to proceed at once to turn and deliver.

2. *Manual Delivery, when either of the Lateral Regions of the Head Presents.*—If the head should present so that one of its lateral regions rests across the superior strait, there will be a physical impossibility for it to pass without change of position; for, in such case, the largest diameter of the head—the occipito-mental—measuring $5\frac{1}{4}$ inches, is in apposition with one or other of the oblique diameters of the strait, which, you will recollect, is only $4\frac{1}{2}$ inches; rendering it, therefore, out of the question for a body of $5\frac{1}{4}$ inches to make its exit through a space of $4\frac{1}{2}$ inches. Here, too, there is a palpable necessity for early ascertaining this character of presentation, for, if it be permitted to remain unchanged under the influence of strong uterine contraction, serious consequences may ensue both to mother and child; the former incurring the hazard and consequences of exhaustion and rupture of the uterus; the latter the serious, if not fatal, effects of undue pressure. Remember, also, that under these circumstances, if there be unnecessary delay, the dreaded alternative of embryotomy may become the last resource! The lateral regions of the head may present as follows:

First Position.—The vertex is in apposition with the left acetabulum, and the base of the cranium regards the opposite sacro-iliac symphysis. (Fig. 65.)

Second Position.—The vertex is at the right acetabulum, and the base of the cranium at the opposite sacro-iliac symphysis.

Third Position.—This is the reverse of the first, and consequently the vertex is at the right sacro-iliac symphysis, and the base of the cranium in correspondence with the left acetabulum.

Fourth Position.—This is the reverse of the second, the vertex being in apposition with the left sacro-iliac symphysis, while the base of the cranium is at the right acetabulum.

How can these four positions be distinguished in a vaginal examination, so that you may be able to recognise them individually? This is very readily accomplished by simply ascertaining the exact position of the ear of the child; for example, in the first position, if it be the right side of the head, the concave border of the ear regards the left iliac fossa; and the right iliac fossa (Fig. 65) if it be the left side of the head. In the second position, the relation of the ear with the points of the pelvis is the same as in the first position for each side of the head. In the third position of the right lateral region, the concave border of the ear is turned toward the right iliac fossa, whereas the convex border corresponds with the fossa, if it be the left lateral region. In the fourth position, the concave border of the ear corresponds with the right iliac fossa, if it be the right lateral region; if, on the contrary, it be a presentation of the left lateral region, the convex portion of the ear regards this same fossa.



FIG. 65.

Let us now suppose that you are in the lying-in chamber; your patient is in labor, and you have ascertained that one of the lateral surfaces of the child's head presents at the superior strait. The very knowledge of this fact admonishes you that nature is at fault; she needs assistance, and the result of the labor will depend very much on the kind of assistance rendered—whether, for example, it be opportune and efficient, or tardy and unskilful. The indications in a case like this are two-fold, either to right the head by bringing the vertex to the strait, and then committing the achievement of the delivery to the natural efforts; or, if the adjustment of the malposition cannot be accomplished, then the necessity will be to terminate the labor by version. With a view of righting or adjusting the head, the hand should be cautiously introduced, and the attempt made, if in the first position, to raise the base of the cranium from the right sacro-iliac symphysis (Fig. 65), while with the

other hand applied to the abdomen, gentle pressure should be directed on the left iliac region, for the purpose, if possible, of depressing the vertex in proper position. But if all attempts to right the head fail, then the indication is at once, if the parts be in proper condition, to proceed with the version of the fetus, the details of which operation we shall discuss in a subsequent lecture.

Manual Delivery, Nature being unable to accomplish Flexion.—In describing the mechanism of natural labor, it was stated that the head, when nature is not interrupted in her resources, undergoes three movements previous to its expulsion, viz. 1. Flexion; 2. Rotation; 3. Extension. The object and mode of production of these movements were fully explained at that time. Well, you are again in the lying-in room; the head presents in the most natural position, the posterior fontanelle regarding the left acetabulum, and the anterior the opposite sacro-iliac symphysis; the contractions of the uterus have commenced, and increase in energy; the os uteri, under their influence, dilates, but there is no change in the head; time passes on, the contractions lose nothing of their vigor, but rather increase in power. On a vaginal examination, you ascertain that the head is still unchanged from its primitive relations with the superior strait; *there is unusual heat in the vagina, the scalp is corrugated or in ridges, and the patient's strength is giving way.* Now, gentlemen, permit me to ask you, what do these symptoms disclose?

Do they not, in the most emphatic manner, portend trouble, and inculcate that nature is oppressed by some obstacle, which she is vainly struggling to overcome; and do they not urgently call upon you for prompt and efficient succor? Do not misinterpret this silent but eloquent appeal of nature, in the hour of her tribulation! Decision and promptness here will enable you to save human life, and draw from grateful hearts the invocation of the blessings of heaven upon you. The well-educated accoucheur will perceive at a glance the true nature of the difficulty; he will recognise the important fact that, with all the efforts of the uterus, the flexion of the head has not been accomplished, and, as a consequence of the failure to bring about this movement, the first link in the mechanism of labor is wanting; under these circumstances, the vigorous uterine contractions have been lost in the abortive attempt to accomplish the physical impossibility of causing a body of four inches and a half to pass through a space of only four inches and a half; for you will remember that the occipito-frontal diameter, which measures in the clear four inches and a quarter, receives the addition of a quarter of an inch by the thickness of the scalp, hair, and sides of the uterus, thus making the aggregate of four inches and a half to make its exit through the oblique diameter of the superior strait, which presents these same dimensions! Here, then,

is an opportunity for the exhibition of true science, which is ever in striking contrast with ignorance and empiricism.

One of two contingencies will present itself in the case such as we have just described; the suffering patient will have by her side a medical man, whose previous education entirely unfits him to appreciate the nature of the difficulty, and who consequently will be in the clouds as to what should be done to overcome the obstacle; or it will be her good fortune to be attended by an accoucheur who has studied in the school of nature, is thoroughly imbued with the principles which ordinarily guide her in the parturient struggle, and who, therefore, is prepared promptly and efficiently to become her substitute in the hour of need. In the former case, ignorant of the true cause of the delay, the medical man will content himself with assurances to the patient that "all is right;" he will tell her to make the "most of her pains," and soon all will be over. These stereotyped expressions, the language of ignorance, may serve for a short time to cheer and infuse hope into the mind of the patient, and appease the anxiety of friends; a very few hours, however, will elapse before the predictions, so confidently made, will be proved to be false; the strength of the patient has entirely given way in consequence of the unavailing effort of nature to cause the flexion of the head—the severe pressure to which this latter has been subjected has resulted in the death of the fœtus; and the head, from the long-continued contractions of the uterus, has become so firmly *wedged* at the superior strait as to render any effort to move it impossible. This is a sad picture; under the circumstances, the alternative may, perhaps, be craniotomy, which will, in the existing condition of things, most probably compromise the life of the mother.

Let us now reverse the scene. Science takes the place of ignorance; the well-instructed accoucheur, knowing that an important part of his duty, in the lying-in room, is opportunely to ascertain when nature is defeated in her plans, so that he may at once be prepared to interpose, will not remain a passive spectator of her unavailing struggles, but will proceed by a proper examination to inform himself of the true cause of the delay in the descent of the head. He soon becomes aware that the efforts to produce flexion have proved abortive; and in lieu of waiting until the work of death has been accomplished, so far as regards the fœtus, and the life of the mother subjected to the most serious peril, he proceeds to do for nature what she has vainly labored to accomplish for herself—in one word, he produces the flexion of the head in the following manner: placing the patient on her back—or, if she prefer it, on the side—the accoucheur gently introduces his hand into the vagina, steadying the uterus with the other hand placed on the abdomen, and with the middle and index fingers

applied to one *os parietale*, and the thumb to the other, he cautiously, during the absence of a pain, elevates the face and depresses the occiput, which necessarily results in the desired movement, viz. flexion. This timely interference—founded on a knowledge of the principles on which rests the mechanism of labor—overcomes the obstacle, securing safety to both mother and child, and ensures to the medical man the enjoyment of a consciousness that he has performed his duty.

4. *Manual Delivery in the Occipito-anterior Positions when Rotation is not effected.*—The contractions of the uterus, we will suppose, have, as they ordinarily will, sufficed to cause the flexion of the head; after this movement, you will recollect that the head rests diagonally in the pelvic cavity, and continues to do so until it has undergone rotation, the effect of which is, in the occipito-anterior positions, to bring the occiput under the symphysis pubis, and the face into the hollow of the sacrum.* But it will sometimes happen that nature cannot effect this rotary movement—under these circumstances, the same phenomena will present themselves as in the case of non-flexion—undue pressure upon the head, corrugated scalp, exhaustion of the mother, and serious hazard to the child. What is to be done? Introduce your hand, and rotate the head; if the hand be not sufficient, then recourse must be had to the forceps; the instrument to be applied in the manner I shall point out when treating of operative midwifery. As soon as it has properly grasped the head, the movement of rotation can be accomplished without difficulty. This being effected, the instrument may be withdrawn, and the termination of the delivery confided to nature; should it, however, be found necessary, from the condition of the mother or other circumstances, promptly to achieve the labor, this may be done by the forceps.

5. *Manual Delivery in the Occipito-sacro-iliac Positions when Rotation is not effected.*—We have, in speaking of vertex presentations and their relative frequency, directed particular attention to the discrepancy of opinion as to which is the second most frequent position of the vertex; and we have endeavored to account for this discrepancy by showing that authors have arrived at conflicting results for the reason that the basis of their calculations depended upon the circumstance—that their examination was made at different periods of labor. Before the time of Naëgelè the very general, indeed the universal opinion obtained that the second position of the vertex, in the order of frequency, was when the occiput corresponded with the right acetabulum. Naëgelè, however, established the fact that, although it is true the occiput is in correspondence with the right lateral portion of the pelvis, as the second most

* Lecture IV, p. 48.

common position of the head, it is only so after a certain progress has been made in the labor. He maintains that, primitively, the vertex is found to present second in frequency when the occiput is at the right sacro-iliac symphysis, and the forehead at the left acetabulum; but at the same time admits that the tendency of the head, in either of the occipito-posterior positions, is to disengage itself by turning the occiput toward one or other of the anterior lateral portions of the pelvis. Indeed, so generally does this spontaneous conversion take place, that Naëgelè himself states, in 1244 occipito-posterior positions, in seventeen instances only did he observe the labor to terminate with the occiput traversing the posterior wall of the pelvis.

So you perceive that, when in these positions the change into anterior ones does not take place, the circumstance is entitled to be regarded as an exception to an almost universal rule.

If, however, you should meet with one of these exceptional cases, my advice would be to do what nature has been unable to accomplish, viz. bring the occiput toward one or other of the anterior and lateral points of the pelvis, depending upon the particular posterior occipital position, which the head may have originally assumed; for instance, the right posterior occipital is to be brought to the right anterior point, and the left posterior occipital to the left anterior point. There are two motives for doing this: in the first place, it is following the course of nature when she is not interrupted; and secondly, it will render the duration of the labor much shorter, for the reason that, in the occipito-anterior positions, the occiput will have to traverse only the length of the symphysis pubis, while in the reverse positions it must pursue the entire length of the sacrum and coccyx. This increase in the ordinary duration of labor would necessarily expose the infant to the danger of protracted pressure, and the mother to the evils of exhaustion and other serious contingencies.

This embraces the first variety of the First Division of our classification of head presentations in manual delivery; and it will be found, I hope, both simple and practical. The second variety of the First Division will be discussed in the succeeding lecture.

LECTURE XXXV.

Manual Labor continued—Certain Complications of Labor rendering Manual Interference necessary—What are these Complications?—Podalic Version, or Turning by the Feet—Rules for Podalic Version—Should one or both Feet be seized?—Manner of Delivering the Child after the Feet have been brought to the Superior Strait—Rules for Extracting the Shoulders—Rules for Extracting the Head—Appalling Consequences of Ignorance—Case in Illustration—Pelvic Version—Cephalic Version by Internal Manipulation—Cephalic Version by External Manipulation—Prerequisites for its Performance—Mattei and his Views; Objections to—Version in Cases of Pelvic Deformity, recommended by Denman—Prof. Simpson's advocacy of Version in Deformed Pelvis—Examination of his Opinion—Objections to Version in these Cases.

GENTLEMEN—In the second variety of our classification of head presentations, in manual delivery, are to be included those cases in which the termination of the labor is effected by version; not because of any malposition of the head, but because of the occurrence of some accident rendering prompt delivery absolutely necessary, either for the safety of the mother or child. We will imagine, for instance, everything is proceeding most auspiciously—the head presents in a natural position, the pains are normal, and there is a proper correspondence between the maternal organs and fetus. Under these favorable circumstances, however, the sky may become suddenly clouded, indicating a storm, and the severity of the storm, if you will permit me to carry out the figure, may be imagined by the character of the cloud. Let us illustrate. Suppose any of the accidents, in this favorable condition of things, capable of complicating natural labor should occur—such as hemorrhage or convulsions. Here, the safety of the parent and child will necessarily be involved in more or less peril, and the degree of peril will depend very much on the gravity of the convulsions, hemorrhage, or whatever else may represent the complication. It is to be borne in mind that artificial delivery will be indicated, not simply because the parturition is complicated with some accident, but because that accident—whatever it may be—has assumed a phase which, without an immediate termination of the labor, will compromise the lives of mother and child. We will now imagine that such a case presents itself, and you have determined, as the most rational alternative, to resort to *version*.

Podalic Version.—How is this operation to be performed? In the preceding lecture, some general rules were given, necessary to be observed in version; in addition to what was then said, we shall now call your attention to a few details essential to be recollected when the operation of podalic turning is indicated. In the first place, I hold it to be a fundamental principle—one not to be forgotten—that version should never be attempted after the head has escaped through the mouth of the uterus; and for two important reasons: 1. After this escape, it will be impossible to return the head; 2. The attempts to do so will incur the serious hazard of rupturing the organ, or the vagina itself, or inflicting injury on the head of the fœtus.

Again: should the head have descended into the pelvic cavity, although still within the uterus—and this will sometimes occur—the indication, as in the former case, will be to resort to forceps delivery, in preference to version.

The hand, it has already been stated, should be introduced into the vagina in a conoidal shape during a pain, but not carried into the uterus except in the absence of pain; the other hand to be applied to the abdomen for the purpose of steadying the womb.

As soon as the hand has entered the cavity of the organ, before attempting to reach the feet, *the first thing to do is cautiously to spread its palmar surface over the face of the child, and endeavor to place the occipital region in the opposite iliac fossa, by gently elevating and pressing with the hand thus expanded over the face.* (Fig. 66.) This is a very material rule, and you cannot but appreciate the great advantage it affords in the successful performance of the operation.

By placing the head in one or other of the iliac fossæ, you at once provide sufficient space for the easy introduction of the hand and arm into the uterine cavity.



FIG. 66.

As a general rule, when the hand has entered the mouth of the organ, this latter is thrown into more or less violent contraction; when this occurs, the hand must remain quiet until the contraction has expended itself.



FIG. 67.

As soon as the uterus is freed from the contractile effort, then the hand, with its palmar surface spread out on the surface of the child, is to be carried upward (Fig. 67), with a view of searching for the knees or feet. It is a mistake to suppose that it is necessary always to seize the feet in podalic version (Fig. 68); if you can grasp the knees, either one or both, then by gentle traction on them you will readily succeed in bringing the feet down to the superior strait.



FIG. 68.

Is it essential to seize both knees, or both feet? If both of either of these extremities can be conveniently grasped, then it is well; but it is by no means essential, for whether one foot or one knee be seized, it should be brought down, and the other will soon follow; should it not, the hand can readily be carried up again; but this is rarely necessary.

When the extremities are grasped, traction is not to be made except during the absence of pain, while these extremities are within the uterine cavity

(Fig. 69.) One of the principal dangers to the child, in the operation of version, is from undue pressure of the umbilical cord; therefore, great caution is necessary in your manipulations to avoid compressing the cord, for fear of interrupting the circulation between the placenta and fœtus; and be careful, too, not to detach the cord from the umbilicus, which might possibly happen, through want of proper caution, especially if it should be curtailed of its ordinary length, by being coiled around the neck or limbs of the child.

Delivery of the Lower Extremities and Trunk.—

Well, you have succeeded in bringing down the feet to the upper strait (Fig. 70), or within the vagina, what next? If the indications for immediate delivery be not urgent, the termination of the labor may be submitted to the resources of nature; on the contrary, if the life of mother or child be in peril, admitting of no delay, then you are to proceed as follows: employing the hand corresponding with the heels of the child, and gently seizing the lower limbs above the ankle, traction during a pain, is to be made downward and backward in a line parallel to the axis of the superior strait; as soon as the limbs have passed beyond the vulva, they should be enveloped in soft linen in order to



FIG. 69.



FIG. 70.

protect them against injury from pressure of the hand; then the two limbs should be seized, respectively, taking care to extend the thumbs lengthwise on the posterior or anterior surface of each, as the case may be, in order that every precaution may be observed to avoid bruising



FIG. 71.



FIG. 72.

them (Fig. 71); the tractions are to be continued, combining with them a movement of slight elevation and depression; when the



FIG. 73.

hips reach the vulva, the hands are to be placed transversely across them, and the same movement of alternate elevation and depression continued (Fig. 72); as soon as the hips have escaped, the child should be supported by the palmar surface of one hand, while with the index and middle fingers of the other carefully introduced along the abdomen, the accoucheur should bring down a loop of the cord, in order to prevent the possibility of lacerating it at the umbilicus during the progress of the delivery; in making this loop, traction should be used on the placental extremity of the cord (Fig. 73). This being accomplished, the combined movement of traction

is to be continued until the entire body of the child is delivered except the shoulders.

Delivery of the Arms.—When the shoulders reach the external organs it will be necessary to attend to the delivery of the arms; the one which is below is to be extracted first, and for this purpose the child being supported on the forearm of the accoucheur, he glides the index and middle fingers of the right hand (if it be the first position of the vertex) along the arm of the child as far as the humero-cubital articulation, and with the thumb in the hollow of the axilla, the arm is brought successively over the side of the head, the face and the neck; when delivered it will be on the right of the vulva. The child is then placed on the right arm of the accoucheur, and the two fingers of the left hand are introduced for the purpose of extracting the other arm, which is above, the mechanism of which is precisely the same as in the other instance (Fig. 74).

Extraction of the Head.—You may, perhaps, suppose that after the entire trunk has been liberated, the difficulty is at an end, and the successful termination of the delivery at hand. But such is not always the case—indeed, the most important, and oftentimes difficult part of the operation is yet to be accomplished—I mean the extraction of the head; and here, permit me emphatically to admonish you that it is not to be delivered by brute force, but in accordance with the laws governing the mechanism of labor. Unfortunately, the recollection of this fact is too often unheeded, and the most disastrous results ensue. I have witnessed some appalling examples of mismanagement in these cases, well calculated to make the medical man pause, and reflect on the measure of his obligations in the sick-room.



FIG. 74.

In order that you may fully appreciate the importance of this question, and with a view of animating you to a just consideration

of your duties when science is needed to take the place of natural effort, we will suppose that the operation of version has been performed, and the entire child delivered with the exception of the head. After the shoulders and arms have been extracted, you find some obstruction to the descent of the head; you make traction on the body of the child, hoping in this way to overcome the difficulty; there is, however, no response to these efforts; you desist for a time from all further action; the mother becomes impatient, the friends are anxious, and you are importuned to do something to achieve the delivery. Traction is again resorted to, but without any avail except to augment the impatience of the mother, and the anxiety of her friends. You are questioned as to the cause of the delay; you make some excuse, as unsatisfactory to yourselves as to those who seek the information; time still rolls on, and still no delivery. All confidence is lost in you; silent but withering evidences of rebuke take the place of smiles and pleasant words; a consultation is demanded; some medical man, versed in his science and adequate to the emergencies of the lying-in chamber, is requested to meet you.

He receives from you a history of the case; he examines the patient, discovers at once the real cause of the obstruction, and proceeds, with your concurrence, to remove it. In a very few moments, he accomplishes what you have vainly endeavored for hours to do, simply because, in the first place, he possesses the requisite knowledge, and, secondly, brings it to bear on the case in point. What is it he does? He supports the child on the anterior surface of his arm, and with the index finger of the corresponding hand introduced into the vagina very soon ascertains the true nature of the obstacle to the descent of the head—this latter is resting obliquely at the superior strait with its great diameter—the occipito-mental, measuring five and a quarter inches—over the oblique diameter of the strait, which you will recollect gives but four and a half inches. Your tractions, therefore, have been unavailing for the reason that they were exhausted in the futile attempt to overcome the physical impossibility of causing a body of five and a quarter inches to traverse a space of only four and a half inches! But, as I shall presently tell you, these tractions are occasionally more than futile; they sometimes result in the destruction of the child, a spectacle almost too shocking to dwell upon!

The nature of the obstacle being clearly ascertained, the accoucheur proceeds to overcome it as follows: he places the index and middle fingers of the hand already in the vagina just below the orbits, or it will suffice to introduce the index finger into the mouth; and while he gently makes traction downward, with the corresponding fingers of the other hand applied to the occiput, he elevates

this latter so that the combined movement results in approximating the chin to the sternum, or, in other words, producing the movement of flexion (Fig. 75); this being accomplished, he then rotates the head bringing the occiput under the symphysis pubis, and the face into the hollow of the sacrum; as soon as the perineum is pressed upon, he has it supported by an assistant, and with a combined lateral and extractive force delivers the head.

The entire operation can oftentimes be performed by the accomplished accoucheur in the brief time I have taken to describe it. The simple question now arises—why has he succeeded, and why have you failed? His success is the direct offspring of knowledge; while your failure is the result of ignorance. He has studied and comprehends the mechanism of labor; he knows that the head, whether it be at the superior strait, first or last, must undergo three movements: flexion, rotation, and extension; and he also understands it to be his duty, when nature is contravened, to perform these movements for her.

Let us now, for a moment, look at the relative position of the two medical men so far as the judgment of the patient and her friends is concerned. You, who have been inadequate to the exigencies of the case, will be scorned as utterly unfit for the requirements of your profession; and scathing, indeed, will be the censure, should the patient exclaim—Doctor, you could have saved my child if you had understood your business, for I felt it move for several minutes after its little body was in the world! Would not such language to a medical man, whose dereliction of duty has righteously called it forth, be the very cup of bitterness itself! How different with him, who has so promptly exhibited the proof of both knowledge and skill. He has vindicated science, and imposed upon the patient and friends an obligation, which, if their hearts be in the right place, they never will believe can be cancelled.

Case in Illustration.—I could cite several melancholy examples



FIG. 75.

of barbarous practice in these cases, to which I have been called, merely, as it were, to bear testimony to the merciless destruction of human life; but I prefer, with the hope of impressing upon you the sacred responsibilities of duty, to bring before you a most heart-rending instance, mentioned to me by my friend and colleague, Prof. Valentine Mott, as having occurred in his practice some years since: An unfortunate woman, a prostitute, was taken in labor with her first child. A physician was summoned to attend her; finding it to be a case of shoulder presentation, he requested a consultation; after much delay and great suffering, version was effected. The child was delivered with the exception of the head; to overcome the obstacle, simple brute force was resorted to; the child's body constituted a lever upon which the most violent tractions were made, but all without avail; a napkin was then attached to the body, and with this double lever the force was renewed—the two medical men straining every effort to bring, under this increased pressure, the head into the world. Nature could not long resist this combination of power, and the result was—the body was torn from the head, the latter still remaining undelivered! Under these circumstances, Prof. Mott was sent for; he found the patient in almost a moribund state; in making an examination *per vaginam*, an extensive laceration of the neck of the uterus was discovered, through which the detruuncated head had escaped into the abdominal cavity! Here was a case in which science was paralysed, for the dying state of the unhappy sufferer rendered any effort to rescue her out of the question. This woman, prostitute as she was, and, as might be supposed, lost to every sense of refined feeling, exhibited a few moments before her death the strongest evidence of a philanthropic heart; evidence which, while it developed sympathy for the woes of others, was a telling rebuke to those who had participated in the act of her destruction. Her last words were these: "*For God's sake, doctors, after I am dead examine my body, so that you may know how to relieve any one who may hereafter suffer as I have done!*" What a lesson do these words inculcate, and how graphically do they portray professional responsibility.

Statistics of Podalic Version: Frequency.—Dr. Churchill has collected a total of 505,691 cases in which version was performed 4,133 times, or about one in 122½. These cases are tabulated as follows:

English Practice.—71,483, version 247 times, or 1 in 247.*

* Mr. E. Garland Figg has recently published some papers on the subject of version which, to say the least, are startling in the views they inculcate. It would really seem that this gentleman has discovered in the operation of Turning an element of safety for the parturient woman far more reliable than anything in the resources of nature. He tells us that since writing the papers alluded to he has

French Practice.—40,376, version 451 times, or about 1 in 89½.

German Practice.—393,823, version 3,393 times, or 1 in 116.

Mortality to the Mother.—In 2,939 cases, in which the result to the mother is specially mentioned, 211 died, or nearly 1 in 14; it must be remembered, however, that this result is merely approximative so far as the operation itself is concerned, for the influence of the complications of labor, such as convulsions and hemorrhage, as also the duration of labor, are to be taken into the account of the mortality.

Mortality of the Infant.—In 3,347 cases, in which the result to the child is detailed, 1,472 were lost, or rather more than 1 in 3.*

It is unfortunate that in the results of the statistics just presented, no statement of the *duration* of the labors has been given; for with a knowledge of this circumstance we could the more readily appreciate the true mortality of turning, both to mother and child. It cannot be denied that the mortality of child-birth, in natural as well as artificial parturition, is materially affected by the duration of the labor. This we shall prove under the head of instrumental delivery. Prof. Simpson has tabulated twenty-four cases in which version was performed as reported by Dr. Collins of the Dublin Lying-in Hospital, with the following important results, showing the influence exercised by the length of the labor on the death of the mothers. Although the cases are comparatively few, they are quite significant as to conclusions:

Duration of Labor.	Proportion of Deaths of Mothers.
Below 24 hours.	1 in 21 died.
Above 24 hours.	1 in 3 died.

Pelvic Version.—Some authors recommend, in lieu of seeking for one or both feet, to introduce the hand and bring down the breech,

attended sixty labors, fifty-five of which he terminated by turning! He has had but one maternal death, and that "occurred five days after the operation by inflammation of the peritoneum of a patient who, with contracted pelvis, had submitted to the ordeal to produce her sixth full-timed dead child." Mr. Figg says in four instances he has broken the arms of the children; but this is of very little importance, for he advises not to be "too candid to the relatives, but at once by your own dictum transubstantiate the injury into a slight sprain received by the infant striking its shoulder against the backbone of the mother while actively prosecuting its uterine gambols!" Really I cannot approve either of Mr. Figg's practice or his morality. [See London Med Times and Gazette, Nov. 13 and 20, and Dec. 25, 1858.]

* Ricker reports that, in the Duchy of Nassau, podalic version was resorted to 2,473 times in 304,150 cases of labor, or 1 in 123. The result to the mother was 176 deaths, or 1 in 14, corresponding very closely with the general mortality given by Dr. Churchill. Nearly 1 in 2 of the children was lost. According to the statistical record of Prof. Schwerer, version was performed 182 times in 21,804 cases, or 1 in 119; 14 mothers were lost, or 1 in 13; 93 children lost, or 1 in 2.

when the child occupies a position in which the breech is nearer the superior strait than the head. In my opinion, however, this practice, when version is really indicated, will be found more difficult, and attended by more hazard than podalic version; therefore, I should advise you to give preference to the latter operation.

Cephalic Version by Internal Manipulation.—As has already been remarked, version by the head was always practised by the ancients; nowhere can I find podalic version even alluded to by them. Their preference for cephalic turning was undoubtedly due to the doctrine they inculcated, viz. that the only natural and favorable position of the fœtus, was when the head presented at the superior strait. Hence the counsel of Hippocrates, in all cases in which any other portion than the head presented, was to displace it, and substitute the cephalic extremity. He relied much on changing the position of the woman, for the purpose of bringing the head down, and gives particular directions as to this point. For instance, he recommends to place something under the hips during the labor, and also under the feet of the bed, so that the patient may be raised higher toward the feet. The hips are to be more elevated than the head, nor should the latter have any bolster. He further says that after the presentation of the fœtus has become changed, the patient is no longer to be elevated as just described, and a pillow should be placed under her head.*

Cephalic version had for a long time fallen into neglect, so that it was rarely resorted to; I believe it is generally conceded that the credit of again introducing it to the attention of the profession is due to M. Flamant of Strasburgh, who, in 1795, became its earnest advocate. Since that period, many successful cases have been recorded. M. Busch, of Berlin, reports that, in 15 cases under his care, he delivered 14 living children; Riecke lost 1 child in 16; while Ricker, of the Duchy of Nassau, reports 10 cases, of which 9 terminated favorably for both mother and child. Other results might be cited, which demonstrate the important fact that all things being equal, *cephalic* version is infinitely more favorable to the child than podalic, for in the 41 cases just quoted only 3 children were lost, or about 1 in 14. In podalic version, on the contrary, the loss is rather more than 1 in 3.

The conditions justifying a resort to *cephalic* version may be enumerated as follows:

1st. The pelvis must possess its natural dimensions, for a contracted pelvis would present positive objections, unless it were ascertained that the head is unusually small.

* *Supinæ reclinatæ molle quiddam coxis substernere oportet, atque etiam lecti pedibus aliquid supponere, quo altiores a pedibus decumbentes, esse queant. Sed et coxæ capite sint altiores; nullum vero capiti cervical subsit. [De Mulier. Morb. lib 1 cap. p. 8.]*

2d. The head must not be very remote from the superior strait.*

3d. The fœtus should enjoy a certain degree of mobility, otherwise the hazard to mother and child would be greatly enhanced. The operation, therefore, should be undertaken before the rupture of the membranous sac, or as soon after as possible.

4th. Cephalic version is indicated when the child is situated transversely, or, for example, in a shoulder presentation.

Mode of Performing Cephalic Version.—Having previously ascertained the true position of the head, that hand is to be introduced which corresponds with the portion of the uterus at which the head is situated; the other hand should steady the uterus through the abdominal parietes. If the membranes be still intact care should be exercised not to rupture them by cautiously gliding the hand between them and the internal surface of the uterus. As soon as the hand reaches the head, it should be grasped by the palmar surface, the accoucheur at the same time affording escape to the liquor amnii: an effort is then to be made to bring the head to the superior strait, while with the hand applied to the abdomen the pelvic extremity of the fœtus should be elevated toward the central line.

Dr. Wright,† of Cincinnati, in a paper on cephalic version to which was awarded a gold medal by the Ohio State Medical Society, suggests the following operation: The fingers are to be applied to the top of the shoulders, and the thumb to the axilla, or to such part as will give command of the chest, and thus afford lateral force. With the other hand upon the abdomen, pressure is to be made so as to dislodge the breech, and cause it to ascend toward the centre of the cavity. Hence, without applying direct force to the head, it is thus brought to the superior strait; if, however, this fail, the head may then be grasped. Dr. Wright states that, in all the cases treated by him from the commencement, the children were born alive.

Cephalic Version by External Manipulation.—It has been proposed, in certain malpositions of the fœtus, to correct them by turning the child and bringing the head to the superior strait through manipulations made on the abdominal walls of the mother. That this species of version may, under some circumstances, be accomplished, I have no doubt. But it involves certain prerequisites—such as an accurate knowledge of the exact position of the fœtus,

* The following is the language of Van Swieten on this point, and embodies, I think, very judicious counsel: "For while the fœtus is disadvantageously situated in the womb, it cannot always be reduced to such a position as to come out by the head; this can be effected only when the head is not very distant from the orifice of the womb, so that it can be easily touched by the fingers of the midwife, and moved out of its position." [Van Swieten's Commentaries, vol. xiv., p. 14.]

† American Journal of Medical Sciences, July, 1855.

sufficient laxity of the abdominal walls, and a ripe experience in this mode of manipulation. In order to ascertain the position of the fœtus, recourse must be had to abdominal palpation, auscultation, and the "toucher." One of the latest and most uncompromising advocates of external version, Dr. A. Mattei,* in addition to transverse positions, recommends it in all cases of presentation of the breech, which he considers unnatural and dangerous, and contrary to the physiology of parturition. He advises that, as soon as it is ascertained the breech is at the superior strait, efforts should be made to carry it up to the fundus of the womb, and bring the head down, by means of external manipulation; and this he says is his general practice, in which he claims to have been remarkably successful. The time at which this conversion is to be made is from the sixth to the ninth month of pregnancy, for at this period the fœtus enjoys a greater degree of mobility in utero, and hence the greater facility of the operation. There are, I think, some cardinal objections to the practice recommended by Dr. Mattei in breech cases:

1. The difficulty of its execution.
2. The danger of provoking the uterus to premature action.
3. Nature, under ordinary circumstances, is quite capable of achieving the delivery when the breech presents, although it must be recollected that the child incurs more hazard than in a head presentation.
4. The possibility that the fœtus may right itself before the completion of the term.

For these reasons, therefore, I should advise you not to adopt the practice in the presentation of the nates.

External manipulation, with a view of changing the position of the fœtus, may be said to be a revival of an ancient practice. It, however, met with but little favor until within the present century. It is, I think, conceded that the credit is due to Dr. Wigand, of Hamburg, for the impulse which this operation has received in our own times, and more especially in Germany. His views, decidedly in full approbation of the measure, have the endorsement of some of the ablest German obstetricians, among whom may be mentioned Busch, Naëgelè, Kilian, Scanzoni, Arneth, Hohl, and others. Indeed, there is no doubt about the very general adoption of the practice by the leading men of the German school. In France, too, Velpeau and Cazeaux recognise external manipulation as a proper resource; while, as I have already stated, the Corsican physician, Dr. Mattei, is more than enthusiastic on the subject. In Great Britain, on the contrary, it has failed of approbation. In our own country, it may, I think, be said that the question is still *sub judice*†

* Essai sur l'Accouchement Physiologique. Par A. Mattei. P. 183.

† An interesting case of cephalic version during labor, by external manipulation,

Let us, for a moment, inquire what it is that the accoucheur proposes to accomplish by external manipulation? The object is twofold: 1. To change an abnormal position of the fœtus into one which is natural; 2. To avoid the necessity of introducing the hand within the cavity of the uterus for the purpose of bringing to the upper strait, through internal manipulation, either the head or the feet. This is undoubtedly the true analysis of the motive; and if the object be carried out consistently with the safety of the mother and child, the operation is entitled to be hailed as one of the greatest benefactions to woman. It can scarcely be necessary to remark that a fundamental condition, before attempting external version, is an accurate knowledge of the position of the fœtus *in utero*; it is this knowledge which constitutes the entire justification of the procedure.

The next question is, how is the position of the child to be ascertained? I think the most reliable means is through auscultation and abdominal palpation; but an important auxiliary will be found in the "toucher" or vaginal exploration. Auscultation, however, may sometimes lead to erroneous judgment, as in the case of a twin gestation.

Well, we will suppose that the diagnosis of position has been satisfactorily determined, the next question is, at what time should the operation be had recourse to? Some writers, in agreement with Mattei, recommend its adoption during the latter months of pregnancy, say from the sixth to the ninth months. Without entering into any special argument on the subject, my advice to you is, not to attempt any interference until labor has commenced; and, as a general rule, the manipulation should be made before the rupture of the "bag of waters," for, it is to be recollected, in proportion to the escape of the liquor amnii will be the diminished mobility of the fœtus, and the consequent difficulty of the evolution.

Mode of Performing the Operation.—The patient should rest on her back; the accoucheur then places one hand flatwise on that portion of the abdomen corresponding with the head of the fœtus, while the other hand is directed to the opposite point at which the breech will be found; these two portions of the fœtal surface being thus embraced, the one hand should gently depress the head toward the pelvis, and a movement of elevation imparted with the other to the breech. The tendency of this counter-movement will be to bring the head of the child to the superior strait, thus converting it from a transverse or oblique position to a cephalic presentation. As a comparative laxity of the abdominal and uterine walls is essential to the success of the operation, it is needless to remind

with safety to mother and child by Prof. B. Fordyce Barker, is recorded in the *American Medical Times*, June 2, 1860.

you that these manipulations are to be restricted to the intervals of the labor pains. It is recommended while the pain continues, to place the patient on the side corresponding with the head, and at the same time to make uniform and guarded pressure on this latter by means of a small pillow or cushion. As soon as the pain ceases, the position on the back is to be again assumed, and the same character of manipulation continued. When the head has been made to descend, it will be disposed, should it enjoy much mobility, to resume more or less its former position; to obviate this, the membranous sac should be ruptured, so that, with the escape of the amniotic fluid, the head may become fixed. It has been suggested by Kilian and others, and with good reason I think, that the rectification of the child's position is not exclusively due to the external pressure of the hands; but that in connexion with this pressure must be taken into account the influence which it exercises in the correction of certain obliquities of the uterus, to which these malpositions of the fœtus are oftentimes due.

If, as sometimes will occur, the operation should prove unsuccessful, the alternative will be version of the child by the introduction of the hand into the uterus; or the plan proposed by Dr. Wright may be attempted. If the head be brought down to the superior strait or not, and any complication present itself calling for immediate delivery, podalic version will be the resource.

Version in Pelvic Deformity.—It now remains for me to call attention to the subject of version in certain cases of pelvic deformity, as recently revived by Prof. Simpson, who gives it the weight and authority of his name, and urges it as a substitute for craniotomy. I say *revived*, for it is well known that this practice was advocated by Denman and some of his contemporaries, but had fallen into almost utter oblivion until again introduced to the attention of the profession by the distinguished writer just named. The two chief arguments in favor of version in pelvic deformity offered by Dr. Simpson, are:

1. That the transverse diameter at the base of the fœtal skull (the bi-mastoid) is less than the corresponding diameter at the arch of the cranium (the bi-parietal).
2. That the head may be extracted consistently with the life of the child, after the body has been delivered, through a smaller space than is needed for its passage in a vertex presentation, and impelled simply by the contractile efforts of the uterus.

In addition to these two main propositions, he says that version, when deformity of the pelvis exists, contrasting it with craniotomy, gives the child a chance of life; it is more safe to the mother, because it can be performed earlier in labor, and more speedily; it enables us to adjust and extract the head through the imperfect pelvic brim in the most advantageous form and direction; lastly,

it is a practice that can be followed when proper obstetric instruments are not at hand, and the avoidance of instruments is generally advisable when it is possible.*

The importance of the question, and the high authority of the gentleman who commends its adoption to the profession, will justify an examination of the arguments adduced in its favor. It is undoubtedly true, as Prof. Simpson alleges, that there is a difference in the respective transverse diameters of the foetal skull at its base and arch; for the former measures three inches, while the latter gives three inches and a half. When describing to you the foetal head in connexion with child-birth,† you will remember I told you the characteristic difference between the base and arch of the cranium is, that the base at the completion of utero-gestation is ossified, and cannot be made to yield to pressure; and, moreover, I pointed out to you that this is a most essential provision, for the exercise of pressure on the lower portion of the brain and medulla oblongata would most likely result in the destruction of the child's life. The arch, on the contrary, from the peculiar construction of the sutures, overlapping each other, will yield occasionally half an inch in its transverse diameter, and the temporary pressure, consequent upon such diminution, could be sustained with impunity for the reason that the upper portion of the brain is not essential to life. It would, therefore, follow that if the contraction in the antero-posterior diameter at the superior strait were less than three and one-eighth inches, the delivery of the head by version would, I think, be physically impracticable; for admitting, for argument's sake, the opinion of Prof. Simpson, that the head can be made to traverse a smaller space, after the delivery of the body, than in an original vertex presentation, yet, as the transverse diameter of the base measures three inches,‡ and undergoes no diminution, it will need a space of at least three inches and an eighth to enable it to pass.

But again: if there be a space of three inches and an eighth, it is possible that the head may descend in a vertex presentation, for the reason that the transverse diameter of the arch will occasionally, through the overlapping of the bones, yield to the extent of half an inch. Therefore, with such a pelvic deformity—such as we have described, it is far better to trust, all things being equal, to the resources of nature than attempt delivery by version. Although it is undoubtedly true, as a general principle in mechanics, that a body may be more easily drawn through a space when its apex presents than impelled through the same space by a *vis a tergo* force

* Provincial Medical and Surgical Journal, December, 1857. P. 647.

† Lecture III.

‡ It is proper to state that in the six cases of measurement of foetal heads given by Prof. Simpson, the bi-mastoid diameter (transverse of the base) varied from 2½ inches to 3½ inches.

directed against the base, yet I do not think this principle will always apply in the case of child-birth. I have much more confidence in the ability of nature when not interfered with, than I have in the most consummate skill of man. What I mean is this—Supposing an instance of pelvic curtailment to the extent of three and an eighth inches, I should have more faith in the efforts of nature so to diminish the transverse diameter of the arch as to enable it to descend, than in the manipulations of the accoucheur, no matter what dexterity he might possess, after the body of the fœtus had been delivered.

But, gentlemen, there are, in my judgment, other serious objections to version in these cases. You have been told—and the fact is perfectly patent—that turning, under the most favorable circumstances, is an operation of peril both for mother and child; and just in proportion as the natural dimensions of the pelvic canal are abridged, the peril will be enhanced. Again: another solid argument, it seems to me, against version in pelvic deformity is, the very probable contingency, after having subjected parent and child to the dangers of the alternative, that the delivery will be required to be terminated by craniotomy. My advice to you is this—if the antero-posterior diameter do not measure more than three and an eighth inches, trust, as long as circumstances will justify it, to the resources of nature;* if these be found inadequate, and there should be indications of peril either to mother or child, then, in lieu of version, have recourse to the forceps, for although, as a general rule, when the head is still at the superior strait, I prefer turning to forceps delivery, yet, in the event of a pelvic deformity, such as we have been considering, my choice would be the instrument. The safest practice, however, would unquestionably be the induction of premature delivery, but this would, of course, involve the necessity of ascertaining the existence of the deformity at some time prior to the completion of utero-gestation.†

* The resources of nature are occasionally most extraordinary in overcoming a disproportion between the head and pelvis. This fact is well known to accoucheurs, who have observed well; and it would be more frequently recognised in practice, were it not for that too general sin—"meddlesome midwifery."

† When discussing the subject of premature artificial delivery, we shall mention the various grades of pelvic abridgment in which this alternative will be justifiable.

LECTURE XXXVI.

Manual Delivery continued—Presentation of the Breech, Knees, and Feet; **Manual Delivery** in—The Indications in these Pelvic Presentations—Malpositions of the Pelvic Extremities—Excessive Size of the Breech; how managed—Presentation of the Pelvic Extremities complicated with Hemorrhage, Exhaustion, Convulsions—The Management of Pelvic Presentations in Inertia of the Womb—Inertia, how divided—Inertia from Constitutional and Local Causes—Importance of the Distinction in a Therapeutical Sense—Blood-letting in Inertia, when to be employed—Ergot, when indicated.

GENTLEMEN—We now proceed to the consideration of our second division of manual labor, embracing the pelvic presentations, viz. the breech, knees, and feet, and which also has two varieties. In the first variety, you will remember, it may become necessary to interfere because of malposition of these extremities; in the second, interference is called for because of the complication of some accident, rendering immediate delivery essential. It is important that you should bear these two distinctions in recollection, as they will be the guides for the particular kind of interference indicated.

Presentation of the Breech.—I have stated that, under ordinary circumstances, natural labor may be accomplished when either the breech,* feet, or knees present; but it may happen that nature is so far contravened when either of these extremities is at the superior strait, either from malposition, excessive size, or from the occurrence of some accident placing in peril the life of mother or child, as to need the prompt interference of the accoucheur. Let us illustrate this interesting practical point. You are at the bedside of your patient, labor has commenced, and a vaginal exploration has satisfied you that it is a case of breech presentation. You are content with the abstract fact that the breech is at the upper strait; you give yourselves no further concern, and rely upon the efforts of nature to terminate the delivery. Pain succeeds pain; time elapses, and yet, notwithstanding strong uterine contractions, the breech does not descend into the pelvic cavity; the reiterated efforts of the uterus have made a decided impression on the strength of the mother, while they have not failed to exercise a pressure more or less injurious on the fœtus itself.

* For the diagnosis and positions of these various presentations, see Lecture XXIV.

In this state of things—animated to duty, perhaps, by the ardent appeals of the patient—you institute another examination for the purpose of ascertaining why the breech does not descend in response to the vigorous efforts of nature; at this late hour, after the exhaustion of the mother from unavailing struggles to advance the labor, and the danger to the child from extreme pressure, you discover that the cause of the delay is due to one of two conditions—either the breech does not present properly, or its great size prevents its progress into the pelvic canal. Here, you perceive, the cardinal error consists in the fact that you were careless in not having ascertained the true nature of the obstruction at an early stage of labor; so that by opportune interference the difficulty might have been overcome, thus sparing the mother the possible fatal consequences to be apprehended from exhaustion and a protracted parturition, while the child would have been protected against the injurious effects of undue pressure.

It is a great principle in midwifery—one to be kept constantly before you—*not to delay action until the mother and child are sacrificed, but to exhibit the aids which science will enable you to do opportunely, and in time to save human life.* What would be your judgment of the navigator who, in disregard of the fearful storm, should remain perfectly passive, and awaken to a consciousness of peril only when his noble vessel had fallen a wreck to the howling tempest? The parallel is perfect, so far as duty is concerned, between the captain to whom is intrusted the safety of his ship, and the medical man, who has in custody the life of his patient.

If it should be found that the obstruction consists in malposition of the breech—in other words, if, instead of presenting centre for centre at the superior strait, one of the hips, the sacrum, or posterior surface of the thighs should rest upon some portion of the upper contour of the strait, the indication is obviously to bring the breech, without delay, in a position parallel to the long axis of the pelvis, so that it may be made to respond to the contractile efforts of the uterus. This rectifying of the position may be effected by the introduction of the hand, during the absence of pain, endeavoring gently to elevate the breech, and place it in proper relation with the strait; should the hand not be adequate, it may become necessary to resort to the lever, or one of the branches of the forceps. I have known instances in which change of attitude in the patient has sufficed to accomplish the object. But we will suppose that these various expedients fail; what then is to be done? The next alternative, about which there should not be a moment's hesitation, is to introduce the hand and bring down the feet, the manner of doing which we shall explain before the close of this lecture.

In the case of excessive size of the breech,* the accoucheur should endeavor to place his index finger in the bend of the thigh, situated posteriorly, and make gentle traction downward and backward in the direction of the axis of the superior strait; in the event of failure to accomplish this, the blunt hook or fillet may be substituted for the finger, of which we shall speak more particularly under the head of Instrumental Delivery. If, however, all these prove negative, then, as in the other instance, the feet must be brought down by the introduction of the hand.

It may, however, happen that the pelvic extremities present in the most natural manner; but owing to the occurrence of some complication, such as hemorrhage, convulsions, or exhaustion, by which the safety of the mother and child may be compromised, it will become expedient to terminate the labor. Under these circumstances, you will proceed as follows: Supposing the breech to present in the first position with the sacrum regarding the left acetabulum, and the posterior portion of the thighs in correspondence with the opposite sacro-iliac symphysis, the left hand is to be carried up as far as the breech, which, by a gentle effort, you will attempt to



FIG. 76.

elevate with a view of enabling you to bring down the limb which is behind, and afterward the one in front (Fig. 76); the delivery is then to be completed as if the feet originally presented.† If,

* The breech will sometimes be found only *relatively* disproportionate in size, and there is a very important practical fact connected with this circumstance. For example, it will occasionally happen that the feet present at the superior strait simultaneously with the breech. Under these circumstances, in consequence of the increased volume of the presenting parts, there will necessarily be more or less delay in the delivery, and very generally interference will be called for. Some authors recommend to replace the feet within the cavity of the uterus in order that more space may be allowed for the descent of the breech. I cannot regard this as judicious practice, and would advise you, instead of returning the feet, to seize one or both, and bring them down, thus converting the case into one of foot presentation.

† See Lecture XXXV

In this state of things—animated to duty, perhaps, by the ardent appeals of the patient—you institute another examination for the purpose of ascertaining why the breech does not descend in response to the vigorous efforts of nature; at this late hour, after the exhaustion of the mother from unavailing struggles to advance the labor, and the danger to the child from extreme pressure, you discover that the cause of the delay is due to one of two conditions—either the breech does not present properly, or its great size prevents its progress into the pelvic canal. Here, you perceive, the cardinal error consists in the fact that you were careless in not having ascertained the true nature of the obstruction at an early stage of labor; so that by opportune interference the difficulty might have been overcome, thus sparing the mother the possible fatal consequences to be apprehended from exhaustion and a protracted parturition, while the child would have been protected against the injurious effects of undue pressure.

It is a great principle in midwifery—one to be kept constantly before you—*not to delay action until the mother and child are sacrificed, but to exhibit the aids which science will enable you to do opportunely, and in time to save human life.* What would be your judgment of the navigator who, in disregard of the fearful storm, should remain perfectly passive, and awaken to a consciousness of peril only when his noble vessel had fallen a wreck to the howling tempest? The parallel is perfect, so far as duty is concerned, between the captain to whom is intrusted the safety of his ship, and the medical man, who has in custody the life of his patient.

If it should be found that the obstruction consists in malposition of the breech—in other words, if, instead of presenting centre for centre at the superior strait, one of the hips, the sacrum, or posterior surface of the thighs should rest upon some portion of the upper contour of the strait, the indication is obviously to bring the breech, without delay, in a position parallel to the long axis of the pelvis, so that it may be made to respond to the contractile efforts of the uterus. This rectifying of the position may be effected by the introduction of the hand, during the absence of pain, endeavoring gently to elevate the breech, and place it in proper relation with the strait; should the hand not be adequate, it may become necessary to resort to the lever, or one of the branches of the forceps. I have known instances in which change of attitude in the patient has sufficed to accomplish the object. But we will suppose that these various expedients fail; what then is to be done? The next alternative, about which there should not be a moment's hesitation, is to introduce the hand and bring down the feet, the manner of doing which we shall explain before the close of this lecture.

In the case of excessive size of the breech,* the accoucheur should endeavor to place his index finger in the bend of the thigh, situated posteriorly, and make gentle traction downward and backward in the direction of the axis of the superior strait; in the event of failure to accomplish this, the blunt hook or fillet may be substituted for the finger, of which we shall speak more particularly under the head of Instrumental Delivery. If, however, all these prove negative, then, as in the other instance, the feet must be brought down by the introduction of the hand.

It may, however, happen that the pelvic extremities present in the most natural manner; but owing to the occurrence of some complication, such as hemorrhage, convulsions, or exhaustion, by which the safety of the mother and child may be compromised, it will become expedient to terminate the labor. Under these circumstances, you will proceed as follows: Supposing the breech to present in the first position with the sacrum regarding the left acetabulum, and the posterior portion of the thighs in correspondence with the opposite sacro-iliac symphysis, the left hand is to be carried up as far as the breech, which, by a gentle effort, you will attempt to



FIG. 76.

elevate with a view of enabling you to bring down the limb which is behind, and afterward the one in front (Fig. 76); the delivery is then to be completed as if the feet originally presented.† If,

* The breech will sometimes be found only *relatively* disproportionate in size, and there is a very important practical fact connected with this circumstance. For example, it will occasionally happen that the feet present at the superior strait simultaneously with the breech. Under these circumstances, in consequence of the increased volume of the presenting parts, there will necessarily be more or less delay in the delivery, and very generally interference will be called for. Some authors recommend to replace the feet within the cavity of the uterus in order that more space may be allowed for the descent of the breech. I cannot regard this as judicious practice, and would advise you, instead of returning the feet, to seize one or both, and bring them down, thus converting the case into one of foot presentation.

† See Lecture XXXV

however, it should be found impracticable to succeed in this way, recourse must be had to the blunt hook, by placing it in the groin of the limb, which is posterior, and making downward and backward tractions until the hips approach the vulva. The hand then can readily complete the extraction.

The same rule of conduct is to govern you in either of the other three positions, remembering always to introduce the hand corresponding with the posterior surface of the thighs.

Presentation of the Feet.—A presentation of the feet cannot be regarded so favorable to the safety of the child as when the breech presents, and for the following reasons: The membranous sac is made to protrude, and becomes more or less elongated through the mouth of the uterus; it, therefore, is unable to reach its full development, and, in addition, it is liable to be early ruptured. Under the circumstances, the uterine orifice is but partially dilated, the consequence of which will be compression more or less serious of the fœtus, to which may be added undue pressure of the umbilical cord, and not unfrequently premature detachment of the placenta, all of which are so many influences adverse to the safety of the child. On the contrary, in a breech presentation, the membranous sac does not rupture as a general rule, until the full dilatation of the orifice, and consequently both the fœtus and cord are protected, at least measurably, against the amount of compression to which they are exposed in a footling case. The life of the child, it should be recollected, is always more endangered when the pelvic extremities present in a primipara than in a multipara, for the reason that, as a general principle, the parturition in the former being more protracted, there is increased risk of pressure of the cord.

In a footling, as in a breech presentation, it may become necessary for science to interpose, either because of malposition or of the occurrence of some accident calling for prompt delivery. In the case of malposition, before anything can be attempted, the first duty of the accoucheur will be to ascertain the special character of the obstacle; for example, the feet, in lieu of being so situated at the superior strait as to become responsive to the contractions of the uterus, may rest, one or both, on the anterior, posterior, or lateral borders of the strait, thus contravening every effort of the womb to cause their descent. Should not the source of the difficulty be early ascertained and removed, the consequence will be exhaustion of the female from fruitless efforts to overcome the physical obstruction, and, perhaps, the sacrifice of the fœtus from the effects of long continued pressure. The indication in such a contingency would be without delay to introduce the hand and right the feet, by bringing them in proper line with the strait. In the event of some complication, such as hemorrhage or convulsions, artificial

delivery must be accomplished remembering to introduce the hand, which corresponds with the heels (Fig. 77) of the child.

Allow me here to make a suggestion not to be forgotten, and it is this: whenever the toes are found to correspond with one of the anterior and lateral portions of the pelvis, as soon as the hips are passing through the pelvis, care should be exercised to rotate the fœtus in its long axis, so as to bring the posterior plane of the child's body in apposition with one or other of the acetabula; if, for instance, the toes are toward the left cotyloid cavity, the back of the fœtus should be brought to the right lateral point of the pelvis; if to the right cotyloid cavity, to the left lateral point. The object of this movement is to reduce the posterior to the anterior position, and thus facilitate the delivery of the head. The same rule also applies in breech presentations, when the sacrum is at either of the sacro-iliac junctions.

Presentation of the Knees.

—This form of presentation is extremely rare, and when it does occur, the general position of the fœtus is the same as in presentation of the feet. The indications are also identical as in footling cases; if there be malposition, it must be corrected; and if the labor suffer from complication, delivery is to be accomplished. For this



FIG. 77



FIG. 78.

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FIG. 77



FIG. 78.

purpose, the hand should be introduced which corresponds by its palmar surface with the anterior surfaces of the child (Fig. 78), and the knees being brought down, the same principles are to guide you as in a foot presentation. It may, however, be that there will be unusual difficulty in extricating the knees with the hand; in this case, the fillet may be advantageously employed, which, being placed in the ham of the leg which is posterior, downward and backward tractions are to be made until the knees are liberated. If these latter be situated so high up as to render the application of the fillet impracticable, then resort must be had to the blunt hook, which, being carefully inserted into the ham of the posterior limb, will enable you by proper extractive force to bring down the knees.

Pelvic Presentations with Inertia of the Uterus.—I have called your attention to the management of pelvic presentations, under certain complications of labor; and it now remains for me to speak of them in connection with *inertia* of the uterus. You will occasionally meet with cases in practice in which, under breech presentations—and the same thing may occur when the vertex or any of the other extremities of the ovoid present—the uterus, after vigorous effort, ceases for some time to contract. This cessation of effort on the part of the organ is very apt to be regarded as the uniform result of *inertia*, and hence, with this abstract view, recourse is too frequently had to certain special remedies, which are known to excite uterine action. The term *inertia* is, I think, oftentimes misunderstood, and this very circumstance leads to bad, if not dangerous practice. The question is worthy of a moment's examination, for it involves an important principle in the lying-in room. In order that you may comprehend what I mean, I shall regard inertia of the womb in child-birth as due to one of two conditions: either to constitutional or local influence. Examples of the former you have in women who have suffered from antecedent disease, or from exhausting drains; inertia may also be traced to a naturally delicate organization; in certain susceptible constitutions, mental emotions will occasion it. Again: excessive plethora may be ranked among its causes. If this view of the subject be correct, it is very evident that one of the fundamental prerequisites for judicious treatment will be to distinguish the particular constitutional circumstance to which the inaction of the organ is to be referred. In the case of inertia from previous disease, or any exhausting influences, the remedy will consist in the administration of stimulants together with generous and renovating diet; if, on the contrary, it be due to mental influence, resort must be had to those agents best calculated to calm the mind, and infuse it with the invigorating auxiliaries of hope and confidence. If the patient labor under plethora, then the abstraction of blood is broadly indicated—the quantity to depend upon the surrounding circumstances of the case.

Among the local causes of inertia may be enumerated the following: increase in the volume of the uterus from an excessive quantity of liquor amnii, which, by temporarily paralysing the muscular fibre of the organ, induces a state of more or less complete inactivity; unavailing efforts of the uterus to rupture the membranous sac, occasioning exhaustion of its fibre; unyielding condition of the cervix in consequence of an abnormal induration of the part; departure of the uterus from its long axis, so as to render abortive any effort to expel the contents, thus, as it were, tiring out the organ; inherent debility of the uterine muscular fibre dependent upon want of proper nervous influence.

You must perceive, gentlemen, how manifestly essential it is to examine critically into the existence of these various causes capable of producing inertia in order that the appropriate remedy may be employed. If, for example, you should be satisfied that the inactive condition of the organ is traceable to excessive distension from an unusual quantity of amniotic fluid, the indication will be at once to rupture the membranes, and, by the escape of the liquor amnii, liberate the uterus from the paralysis to which it has been subjected by the excessive distending force. The same course, also, must be pursued when, in consequence of the prolonged resistance of the membranes, nature is unable to rupture them. If the source of the trouble be found to consist in an unyielding, indurated condition of the cervix, benefit may be derived from the application of the belladonna ointment; if this fail to afford the necessary relief, I should not, under the circumstances, hesitate to incise the cervix; and, in having recourse to this expedient, I would advise you to make several small incisions on the anterior and posterior lips.

Suppose, however, that neither of the above conditions of the organ be present, and you should have ascertained that the inertia is due to malposition of the uterus, constituting a want of parallelism between its long axis and that of its superior strait, thus preventing the uterine effort from concentrating on the centre of the pelvic canal, and consequently wearying the organ in useless struggles to expel its contents. It can scarcely be necessary to say to you that, in such case, the indication would be two-fold: either to restore the uterus to its parallelism, or proceed at once to terminate the labor by artificial delivery.

When the inertia can be traced to inherent debility of the uterus consequent upon a want of nervous power, then you will find an efficient remedy in ergot. If there be nothing to contra-indicate its administration, it may be given in infusion, powder, or tincture. For this special purpose, I prefer it in the form of infusion—say, 3ij. of the powder in ℥iv. of boiling water; let it infuse for twenty minutes, a tablespoonful to be taken at an interval of ten

minutes, until action of the uterus is produced. If the ergot be of proper quality, it will rarely happen that it will not have the desired effect after a few doses are administered. In this latter character of *inertia*, I have found repeated drinks of ice water, taken in small quantity, to be of signal service in promoting uterine contraction; warm tea or gruel will occasionally have the same effect.

LECTURE XXXVII.

Manual Delivery continued—Trunk or Transverse Presentations, including the Abdomen, Chest, Back, and Sides of the Fœtus—Presentation of the Abdomen; its Diagnosis and Treatment—Presentation of the Chest, Back, and Sides; how Managed—Shoulder Presentation with or without Protrusion of the Arm—Treatment of—Management of these Cases by the Ancients, barbarous and destructive to the Child, because founded upon Ignorance of the Mechanism of Labor—Their Management, Philosophic and Conservative in our Times—Spontaneous Evolution—Meaning of the Term—Divided into Cephalic and Pelvic—Comparative Rarity of Spontaneous Evolution—Statistics by Dr. Riecke—Statistics of Dublin Lying-in Hospital—Fearful Fatality to the Child in Spontaneous Evolution—Dr. Deuman's Exposition of the Manner in which the Evolution is performed, shown to be Erroneous by Dr. Douglass, of Dublin—Spontaneous Evolution not to be relied upon when Artificial Delivery is indicated.

GENTLEMEN—Our third division of manual labor embraces trunk or transverse presentations together with those of the arm and shoulder.* It is quite obvious that when the trunk, shoulder, or arm presents, it will be physically impossible for the child to pass, except through spontaneous evolution, for the reason of the disproportion which must necessarily exist between it and the maternal organs. Therefore, the alternative in this form of presentation will be to change the position of the child by version. I shall first speak of trunk presentations, and in doing so avoid the numerous subdivisions of authors, and present the subject to you under the following heads: 1. Presentation of the abdomen; 2. Presentation of the chest; 3. Presentation of the back; 4. Presentation of the sides of the fetus, including the shoulder and hips.

It is proper here to remark, that I shall recognise only two positions for each of the presentations of the trunk, and for the substantial reason that they practically embrace the various divisions of authors, inasmuch as the rules for their termination are identical.†

Presentation of the Abdomen.—In this presentation, which is extremely rare, the child is in a state, as it were, of extension, and consequently the risk it incurs is much greater than in either of the

* Indeed, some clever writers comprehend transverse presentations under those of one or other shoulder, believing that the abdomen, back, and sides of the fetus are, when found at the superior strait, simply varieties of the shoulder presentation.

† This is the classification suggested by Halmagrand, and others, and I adopt it because I think it not only rational, but eminently practical in its results.

other trunk presentations. When the abdomen is at the superior strait, the fact will be ascertained by the presence of the umbilical cord, which sometimes will have descended into the vagina, and even protruded beyond the external parts; the child lies so completely across the pelvis that its anterior surface is in relation with the mouth of the uterus, while the dorsal region looks toward the fundus of the organ. Whether the head be at the left or right side of the pelvis—or, in other words, in order to recognise the particular position of the fœtus, the accoucheur will readily discover in directing his finger from right to left, with which side of the pelvis correspond the borders of the false ribs, the crests of the ilia, and the organs of generation.



FIG. 79.

First Position.—Here the head is in relation with the left iliac fossa, while the feet regard the opposite point of the strait. In this position, the left hand, properly prepared, should be introduced into the uterus (Fig. 79); it should then gently pass to the left side of the child, gliding along the entire posterior surface of the body until it reaches the feet, which, being seized, are to be brought down, and converted into the second position of the feet. The delivery to be terminated as if it were originally a footling case.

Second Position.—This position is precisely the reverse of the preceding, the head corresponding with the right, and the feet with the left iliac fossa; in this case the right hand should be selected, and the delivery accomplished as in the former position; the feet, however, in this instance will be converted into the first position.

It may happen that, on introducing the hand, only one foot can be seized. Under these circumstances, let the foot which has been brought down be attached by a fillet, and retained in position, while the hand is again introduced for the purpose of seeking for the other extremity which, when grasped, is to be placed by the side of the foot held by the fillet.

Presentation of the Thorax.—When the thorax presents, it will be readily recognised by the ribs and sternum, as, in the presentation of the abdomen, the anterior surface of the child's body is

downward, and the dorsal plane is upward. Here the head is much nearer the superior strait than the feet, rendering it more difficult to deliver by the feet than in an abdominal presentation; for this reason, it has been recommended to bring the head instead of the feet to the strait, and then confiding the termination of the labor to the natural resources, unless there be some urgent indication for the immediate extraction of the child. The objection to the practice of cephalic version in this case is two-fold: 1. It is very difficult to place the head of the child in proper position at the superior strait, without inflicting upon it more or less injury, and incurring at the same time the hazard of rupturing the uterus; 2. If the head should be brought to the strait, and not placed in correspondence with the pelvis, the necessity will then arise of having recourse to podalic version. For these reasons, therefore, I should advise you to proceed at once, in case of thorax presentations, to seek for the feet.

First Position.—The head is turned toward the left, and the feet toward the right iliac fossa. The left hand is to be introduced in the same manner as indicated in the first position of the abdomen; and when the feet are grasped, they are to be brought to the strait, and the labor is terminated as in the first position of the feet.

Second Position.—The head to the right, and the feet regarding the left iliac fossa. The right hand is introduced, the feet grasped, and the delivery accomplished as in the first position of the feet.

Presentation of the Back.—When the back presents, the child is not subjected to the same degree of danger as in a presentation of the abdomen, for the reason that, instead of being extended, it is flexed on itself. There is no difficulty, with a due degree of attention, in recognising a back presentation; the evidences are: a broad, and more or less elastic tumor, the borders of the false ribs, together with the two scapulas. These various points will also enable you to ascertain the particular position.

First Position.—The head is in correspondence with the left, and the feet with the right iliac fossa. The left hand is to be introduced in a state of supination, and the fœtus being gently grasped, its position is slightly changed, so that the back is brought toward the symphysis pubis; the hand then pursues the anterior plane of the body, and after successively passing over the abdomen and thighs, reaches the knees and feet, which, being brought to the strait, are converted into the second position of the feet, and the labor is then terminated, as already indicated.

Second Position.—Here, the situation of the child is reversed, the head being in relation with the right, and the feet with the left iliac fossa; the right hand being introduced, the same rules are to be observed as in the first position.

Presentation of the Sides.—Under this head will be embraced, as

identical, the lateral surfaces and hips of the child, the recognition of the latter at the superior strait constituting the diagnosis of the presentation. The presence of one or other hip will be revealed by a small rounded tumor, the sacrum, crest of the ilium, and the organs of generation.

First Position of the Right Hip.—In this position the head regards the left, while the feet are to the right of the pelvis; the dorsal surface of the child is in relation with the symphysis pubis, and the anterior plane with the promontory of the sacrum. The left hand is introduced, and, after elevating the fœtus, the feet are reached by pursuing the anterior surface of the child; they are then brought to the strait, and the delivery terminated.

Second Position of the Right Hip.—The head to the right, the feet to the left of the pelvis; the anterior plane is in front, the posterior behind. The right hand is introduced, and manipulation the same as in the former case.

First Position of the Left Hip.—The head toward the left iliac fossa, the feet to the right. With the left hand the fœtus is to be elevated, and after pursuing the anterior surface of the body, which is in front, the feet are grasped and brought to the strait; the presentation is reduced to the second position of the feet.

Second Position of the Left Hip.—The head to the right, the feet to the left. The right hand is to be introduced; the same rules observed as in the previous instance, except that the feet are reduced to the first position.

Presentation of the Shoulder.—In calling attention to shoulder presentations, it will be proper to divide them into two classes: 1. Where simply the shoulder presents; 2. Where, together with the shoulder, the arm and hand protrude. As we proceed, it will be seen that this is a very important division, and has involved conflicting opinions in reference to the special practice to be adopted in these cases. It is a point of much moment to remember that always, in shoulder presentations, it is essential that an accurate diagnosis be made *early*; for, generally speaking, precisely in proportion to the time which has elapsed from the escape of the liquor amnii to the determination of the diagnosis, will be the difficulty of operating, and also the danger to the child. Some care will be needed in distinguishing the shoulder, for it may be confounded with the elbow, the breech, hips, or knee. The true distinction, the one which makes it certain that it is a shoulder presentation, consists in recognising with the finger the scapula, clavicle, and the upper ribs, which may be done with a proper degree of caution.

First Position of the Right Shoulder.—The head is to the left, and the feet to the right side of the pelvis; the back of the child is turned slightly upward toward the pubes, while its anterior plane has a posterior aspect. The left hand being introduced, the shoul-

der is gently raised, and the feet are then sought for by carrying the hand along the anterior surface of the child's body ; they are then brought to the strait of the pelvis, being converted into the second position of the feet.

Second Position of the Right Shoulder.—The head to the right, the feet to the left ; the back of the child is posterior, and the anterior plane is directed forward and upward. With the right hand, the accoucheur elevates the shoulder ; and seizing the feet, in traversing the anterior surface of the body, brings them to the strait converting them into the first position.

First Position of the Left Shoulder.—The head to the left, the feet to the right ; in other respects, the position of the child is the same as in the preceding example. The left hand is introduced, and the feet brought to the strait, converting them into the second position.

Second Position of the Left Shoulder.—The head to the right, the feet to the left ; the posterior plane of the child above and a little in front, the anterior plane below and slightly backward. The left hand is carried up to the shoulder and trunk, on which a partial movement of rotation is effected in order to place the anterior plane below ; the feet are then brought to the pelvis, being converted into the first position.

Presentation of the Shoulder with Protrusion of the Arm.—The treatment of this compound presentation by the accoucheurs of the present day forms not only a striking contrast, but exhibits in a most favorable manner the progress of obstetric science as compared with the practice inculcated by our predecessors. In this presentation, delivery was deemed impossible with safety to the child, and hence the most extraordinary rules were instituted for the management of these cases. Indeed, whenever the arm protruded, in shoulder presentations, the accoucheur in former times regarded it as one of the most formidable complications of the lying-in room ; but one thought occupied his mind—the destruction of the child as the necessary and only means of saving the life of the mother. With this view, numerous expedients were resorted to ; one inculcated the practice of twisting off the arm, and terminating the delivery by bringing down the feet ; another suggested amputation ; a third recommended to diminish the volume of the arm by means of scarifications and incisions. Deventer, with the hope of causing the fœtus to withdraw the arm into the uterus, directed the hand to be pinched or pricked with a pin ; for the same purpose ice was employed. Need I tell you, also, that, ignorant of the principles on which rests the mechanism of labor, the absurd and reckless practice was maintained by some of making tractions on the protruded arm, under the conviction that the body of the child could thus be delivered !

But all these were the suggestions of men who had not sufficiently studied in the school of nature; they neither comprehended her resources when undisturbed by contravening influences, nor did they appreciate the ability of science to aid her in the moment of want. Now, however, through the advances which obstetric medicine has made, these murderous alternatives have been abandoned, and a more conservative and rational practice substituted. The protrusion of the arm, in a shoulder presentation, is no longer regarded as necessarily fatal to the child; and, under ordinary circumstances, these cases, with a proper degree of care, can be managed with safety to both mother and fœtus. There are, however, it is well to remember, certain conditions connected with this form of presentation, which will very much enhance the danger to the child, and not unfrequently involve the mother in more or less peril. If, for example, much time have elapsed since the escape of the liquor amnii, causing rigidity of the os uteri, or undue manipulations have been practised inducing an inflamed state of the maternal organs, the difficulty of terminating the delivery and the danger will be greatly increased.*

First Position of the Right Shoulder with Protrusion of the Arm.—The fact that the arm protrudes in a shoulder presentation, need occasion no undue alarm to the practitioner, for the circumstance will neither necessarily involve the safety of the child, nor embarrass the operation essential to its delivery. Indeed, in these cases the termination of the labor by version is, all things being equal, accomplished with more facility than in head presentations, for the reason that the feet, because of their not being situated so high up, are more readily seized, and there is also, as a general principle, more room for the introduction of the hand. *In the first position of the right shoulder*, the pelvis of the fœtus will be toward the right and more or less toward the upper portion of the uterus, while the head regards the left iliac fossa. The first thing to be done is to attach a fillet (which consists of a ribbon or piece of linen one inch in width, and twelve inches in length) around the wrist of the protruded arm. The fillet should at first be entrusted to an assistant, but after the feet are brought down to the strait, the accoucheur should take charge of it, the object of the fillet being not to prevent the ascent of the arm into the uterus (which will take place as the feet are brought down) but merely to keep the arm elongated on the body during the manipulation. As in the

* The long-continued pressure of the contracting womb will very naturally occasion a livid hue of the arm, together with more or less tumefaction, giving rise to the belief that the child is dead, thus inducing the practitioner to a resort to instruments to dissect the fœtus for the purpose of extracting it. This will oftentimes prove a fatal error, for these physical changes may occur without necessarily compromising the life of the child.

first position of the right shoulder the feet regard more or less the right portion of the uterus, the left hand should be introduced, and carried as far as the axilla; it should then be directed along the anterior surface of the child's body, until the feet are reached; these are to be brought down to the strait, and the labor terminated as in the second position of the feet.



FIG. 80.

Second Position of the Right Shoulder with Protrusion of the Arm.—In this case, the fillet is to be attached as in the first position; the right hand is then to be introduced (Fig. 80), and directed along the anterior surface of the child with a view of reaching the feet; these are brought down to the strait (Fig. 81), and the delivery is terminated as in the first position of the feet.

First Position of the Left Shoulder with Protrusion of the Arm.—Here, the left hand is to be introduced, and the same rules followed as in the second position of the right shoulder, except that the feet are reduced to the second instead of the first position.



FIG. 81.

Second Position of the Left Shoulder with Protrusion of the Arm.—The right hand to be introduced, and the same principle pursued as in the first position of the right shoulder, the feet being reduced to the first position.

Spontaneous Evolution.—Having now spoken of the general principles which are to guide the practitioner in cases of shoulder

presentations, either with or without protrusion of the arm, it is proper that I should allude to two other questions in connexion with this subject, viz. *evisceration* in cases in which version is found impracticable, and *spontaneous evolution*. Evisceration of the fœtus will engage attention in a future lecture, when treating of instrumental delivery; on the present occasion I propose to make a few observations in reference to the interesting point of *spontaneous evolution*. This term implies the ability possessed by nature of causing a voluntary change in the position of the fœtus in utero, so that a part of the fœtal body originally more or less remote from the superior strait may descend into the pelvic excavation, and be delivered without displacing that which first presented. Spontaneous evolution is divided into *cephalic* and *pelvic*; in the former, the head descends to the superior strait; in the latter, the pelvis. I must confess I have never, in the course of my observation, met with an instance of what may be properly termed spontaneous evolution; although I have on more than one occasion heard medical gentlemen speak of it as having repeatedly fallen under their notice. I am inclined to think, however, that while they intended no violence to truth, their opinion was founded on a misapprehension of the real position of the fœtus. There can be no doubt that this spontaneous change will sometimes take place; for practitioners of conscience and high moral worth have testified to its having occurred in their practice. There is, however, a very general concurrence of opinion on one point, viz. its extreme rarity. It is mentioned by Dr. Riecke that it was observed only 10 times in 220,000 labors at Wurtemberg, while Drs. Johnston and Sinclair report its occurrence twice in 13,748 deliveries in the Dublin Lying-in Hospital. In the Vienna Hospital, under Dr. Spaeth, there was but one instance of spontaneous pelvic version in 12,523 cases of labor. Its fatality to the child is most fearful; in thirty cases mentioned by Denman, but one child survived.

Some of the older writers were unquestionably impressed with the idea of the great mobility of the fœtus *in utero*, and it was upon this conviction, no doubt, that was based the direction of causing the pregnant female frequently to change her position, and, indeed, to be shaken for the purpose of overcoming a malpresentation, as directed by Hippocrates himself. But it is to Dr. Denman that we are indebted for the first full account, by the natural powers of the system, of what he denominated "*spontaneous evolution*."* In the

* Although it is conceded that Dr. Denman was the first author to direct special attention to the subject of "*spontaneous evolution*," yet the possibility of its occurrence had been recognised previous to his time. Dr. Ramsbotham says Anthony Ererard seems to have been the first who described a case of "*spontaneous evolution*." It happened in his own wife's third labor, and she had gone to her full term. The book in which the case is mentioned, a very scarce 12mo., is entitled *Nœvus et*

course of his extended practical observation, he had noticed the spontaneous change in the position of the fœtus under a shoulder presentation, but his explanation of the phenomenon has been shown by Dr. Douglass of Dublin to be erroneous. Denman maintained that, during the process of labor, in an interval of uterine repose, the shoulder and arm receded within the cavity of the organ, and were replaced by the breech of the child. Douglass,* on the contrary, demonstrated the fallacy of Denman's opinion by proving that the fœtus, without any recession of the superior extremity, descends into the pelvis doubled on itself, and is then expelled. He showed that the strong contractions of the uterus at first press the shoulder and chest into the pelvis, when the acromion process is felt under the symphysis pubis; as the loins and nates descend into the pelvic excavation, the apex of the shoulder passes upward in the direction of the mons veneris, thus yielding more space for the passage of the breech into the cavity of the sacrum; in this way, after subjecting the perineum to extraordinary distension, the nates together with the shoulder are expelled. With this explanation, which is now generally admitted, it is evident that the shoulder becomes, as it were, fixed under the arch of the pubes, this latter being made a fulcrum on which the fœtus revolves. In order that spontaneous evolution may be accomplished, it is essential that either the fœtus be relatively small, or the pelvis more than ordinarily capacious; and it is an interesting fact to note that, in several instances in which this movement has been cited by authors, the fœtus had not reached its full time.

I cannot divest my mind of the conviction that a too full reliance on the ability of nature to effect spontaneous evolution has oftentimes been followed by bad results in the lying-in chamber. This reliance, in cases of shoulder presentation, causes the accoucheur to allow the proper time for terminating the delivery to pass, thus subjecting the mother to more or less hazard, and the life of the child to almost certain sacrifice. While, therefore, you are to concede the occasional occurrence of the phenomenon, yet my advice to you is—*never to depend upon it as an alternative in any case in which it is possible to terminate the labor by the introduction of the hand, but to proceed without delay to bring down the feet as already indicated, the instant the fit opportunity will justify your interference.* My reasons for this advice are as follows: 1. Spontaneous evolution is among the extremely rare occurrences of the parturient room. 2. The child is almost always sacrificed. 3. The risk of rupture of the uterus from the necessarily protracted and

Genuinus Hominis Brutique Animalis Exortus. It was printed at Middleburgh in 1661.

* *An Explanation of the Process of the Spontaneous Evolution of the Fœtus, &c.* By John C. Douglass, M.D., etc., Dublin, 1811.

increased contractions of the organ. 4. The great difficulty and consequent danger of terminating the delivery after the shoulder has been pressed low down into the pelvic cavity, in the event of nature being unable to accomplish the movement.

It may, however, happen that you will not be called to the case until it is too late to attempt the version of the child, and that, under these circumstances, from the length of time which has elapsed, the shoulder is so far forced into the pelvis as to render the effort to bring down the feet utterly impracticable. What, in such a contingency, is to be done? Here you will be compelled to have recourse to evisceration, or to the decapitation of the child; of the manner in which these operations are to be performed we shall speak under the head of *embryotomy*.*

* The following is an interesting example of podalic version, connected with malposition of the uterus: it should more properly have been introduced when discussing the displacements of the gravid womb:

Some years since I was requested by Dr. Elwes, of the United States Army, to visit Mrs. B. at Fort Hamilton, Long Island, distant twelve miles from the city. I was informed by Drs. Carpenter and Elwes, the former of whom saw her at the commencement of her sickness, that she had been in labor, not, however, accompanied by very strong pain, for eight days, and that the liquor amnii had been passing from her, in small quantities, for the four days previous to my visiting her. Dr. Carpenter, who was the family physician, and who had attended her in two former accouchements, stated that he had been unable to reach the mouth of the womb, and that, from the commencement of her labor up to the period at which I arrived, he had been completely foiled in every attempt to effect this object. Dr. Elwes had experienced the same difficulty. At the request of these gentlemen, I proceeded to make an examination. On introducing my finger into the vagina, I discovered a large resisting tumor, which I recognised to be the head of the fetus, the womb intervening between it and the finger. In examining very cautiously the surface of the tumor, I was unable to discover the os tinæ. It occurred to me that this was a case of retroversion of the neck of the womb, and in gently sliding my finger under the foetal head, and carrying it towards the posterior part of the pelvis, I felt the os tinæ, which was turned so entirely backward as to regard the concavity of the sacrum. It was now quite apparent why the labor had been so protracted, and it was certain that while the uterus retained its present position, delivery would be out of the question. In consequence of the malposition of the womb, the whole force of the uterine contraction was directed in such way as to render it physically impossible (without laceration of this viscus) for the child to pass through the pelvis. The position of the uterus, under ordinary circumstances, is parallel, or nearly so, to the axis of the superior strait, so that the whole force of the contractile effort being directed from above downward, it is evident, should there be no impediment to a natural delivery, that the child must be propelled through the maternal pelvis. In this case, however, in consequence of the malposition of the womb, the force of the contractions was centred against the posterior wall of the cervix uteri, and the point of resistance was found to be the internal surface of the sacrum. This, then, accounts at once for the difficulty of the labor, and shows most conclusively that it could not have been otherwise than protracted. As soon as I had discovered the position of the uterus, and thus assured myself of the entire cause of the delay, I withdrew my hand, and suggested to Drs. Carpenter and Elwes, in which suggestion they both coincided, that, in my opinion, this case presented two indications, viz.:

LECTURE XXXVIII.

Instrumental Delivery—Instruments divided into Blunt and Cutting—**Blunt Instruments**—What are they?—The Fillet and its Uses—The Blunt Hook and Vectis; their Uses—The Forceps—The Abuse of Instruments in Midwifery—Their too General and Indiscriminate Employment—The Object of the Forceps—The Forceps an Instrument for both Mother and Child—Abuse of the Forceps—Case in Illustration—The Forceps a Precious Resource when employed with Judgment—Statistics of Forceps Delivery—What is the true Power of the Forceps?—Is it a Tractor or Compressor?—The Forceps a Substitute for, or an Aid to, Uterine Effort—To what Part of the Child should the Instrument be applied?—The Advantages and Evils of the Forceps—How is the Head of the Child to be Grasped by the Instrument?—Modification of the Forceps—Its Cranial and Pelvic Curves—The Author's Forceps—Indications for the Use of the Forceps—Time of Employing the Instrument—The Opinions of Denman, Merriman, and others—Objections to—The Justification of Forceps Delivery, a Question of Evidence to be Determined by the sound Judgment of the Accoucheur.

GENTLEMEN—We shall now consider the second branch of preternatural labor, viz. *Instrumental Delivery*—and here, permit me to say, we enter upon a most important discussion. The instruments recognised in midwifery are embraced under two classes—*blunt and cutting instruments*. The former are applied to the child, and do not necessarily involve its life; the latter are used either on the

1st. To rectify, as far as practicable, the malposition of the cervix uteri.

2d. To turn and deliver by the feet.

I should have remarked that the mouth of the womb was quite soft and dilatable. It will, I apprehend, be unnecessary for me to enter into any argument to show the paramount necessity of the first indication; and if it be recollected that the patient was in a state of dangerous exhaustion, the propriety of the second will be evident. But why, it may be asked, not apply the forceps? My answer to this question shall be brief. The head of the fœtus was still at the superior strait, and, without reference to the opinions of others on this subject, I can aver for myself, that, where immediate delivery is indicated, I should always prefer (provided the parts were in a proper condition) turning by the feet, to the delay which must necessarily attend delivery by the forceps before the head has begun to descend into the excavation of the pelvis. The operation being agreed upon, Mrs. B. was placed on her back, with her breech on the edge of the bed, her legs flexed on her thighs, and her feet resting on the hands of Drs. C. and E., who were seated one on each side of me. I introduced my right hand, and, with the other applied to the abdomen, I reached the os tincæ: I then succeeded in fixing my index finger within the circle of the anterior lip, which was cautiously brought toward the centre of the pelvic excavation, at the same time gently pushing back the fundus with the hand applied to the abdomen. In this way I succeeded in overcoming the malposition of the uterus; and in fulfilling the second indication I proceeded as follows: Before determining on which

mother or child. When employed on the mother, her safety will, as a consequence, be placed in more or less peril; and I need scarcely remark that the destruction of the child is the inevitable result of their use upon it.

Blunt Instruments.—These consist of—1. The Fillet; 2. The Blunt Hook; 3. The Lever or Vectis; 4. The Forceps.

1. *The Fillet.*—This is simply a piece of ribbon or linen, one inch in width and twelve in length. It may be applied under the following circumstances: (a) In a breech presentation where, in consequence either of the great size of the nates, or the undue sluggishness of the labor, it becomes necessary to aid nature; it should be passed up with the finger to the bend of one of the thighs, so as to encircle the groin, the two ends of the fillet are then seized by the accoucheur, and, with well-directed traction, it becomes a ready means of bringing down the breech. (b) In cases in which the trunk is expelled, and there is unusual delay in the descent of the shoulders, the fillet being placed under the axilla will be of essential use. (c) The knees may have descended into the pelvic excavation, and, for want of proper uterine effort, remain there, thus protracting unnecessarily the delivery; here again the fillet carried to the bend of the knee becomes an important aid. (d) In version, when only one foot has been brought down, the fillet may be attached around the ankle, while the accoucheur seeks for the other foot. (e) In shoulder presentations with protrusion of the arm, the

hand to employ in order to effect the version, I first acquainted myself with the precise situation of the fetal head, which I found to be placed in the second position of the vertex, the posterior fontanelle corresponding to the right acetabulum, and the anterior to the left sacro-iliac symphysis; consequently I introduced the right hand for the purpose of performing the version, in order that the natural curve might be given to the child's body. The hand was carried up in the usual manner until the feet were reached; these were gently grasped and brought into the vagina. The patient, at this time, became alarmingly exhausted; she rallied under the influence of a little brandy and water, and I proceeded to complete the delivery without delay. The child was alive and vigorous, and both parent and offspring recovered from their perilous position, and are, I believe, at this time in the enjoyment of good health.

The above case is interesting on two accounts. In the first place, that the child should not have been sacrificed by the great length of time Mrs. B. was in labor; and, secondly, the possibility of mistaking the retroversion for an imperforate condition of the os tincæ. Cases are recorded in which the orifice of the womb was completely obliterated in women in labor. Lauverjat's case, in this particular, is interesting: it is cited by Sabatier in his *Médecine Opératoire*. Lauverjat not being able to detect the mouth of the womb, during labor, in a woman pregnant for the first time, made an incision into the portion of the uterus corresponding with the orifice. M. Gautier, a Parisian surgeon, had a similar case. Instances of the same kind are likewise quoted by Hammond and others. And in another part of this work I will give the particulars of two cases, in which, in consequence of injuries inflicted on the os tincæ, it became necessary for me, at the time of labor, to incise the orifice, which resulted favorably to both mother and child.

fillet should be placed around the wrist, for reasons already explained when treating of this form of presentation.

2. *The Blunt Hook.*—This instrument is employed for most of the purposes for which the fillet is used, viz. to bring down the breech or shoulders, and also to facilitate the delivery of the knees, when their stay in the pelvic cavity is protracted. The mode of using the instrument is as follows: The fingers of one hand being carefully carried to the particular part of the fœtus on which the blunt hook is to be applied, the instrument, previously warmed and oiled, is made gently to glide along the hand, which acts as a direc-



FIG. 82.

tor, and when the point is reached, either the bend of the thigh (Fig. 82), the knee, or axilla, as the case may be, the hooked extremity of the instrument is to be cautiously applied to either of these

parts, and then downward traction exercised. In this way, the fœtus will be brought down without injury to it or the parent, and the delivery promptly terminated. As soon as the part reaches the vulva, the instrument should be withdrawn, and the delivery, if necessary, terminated by the hand.

3. *The Lever or Vectis*.—This instrument has been variously estimated by different writers on midwifery; some claiming for it merits of a high order, while others repudiate its use altogether. It has been urged that the lever can oftentimes become a substitute for the forceps, inasmuch as it may be made an instrument of traction. It does seem to me, however, that under no circumstances should it be resorted to as a tractor; the only purpose to which it can be legitimately applied is to correct peculiar malpositions of the head. For example, when the occiput is extended backward, the lever will prove, in dexterous hands, an important auxiliary in changing the position to one of the vertex. Or, in case the head should fail to rotate in the pelvic cavity, and the hand be inadequate to accomplish the movement, the vectis may be employed with good effect.

Contrast between the Forceps and Lever.—I do not deem it necessary to institute any special contrast between the comparative advantages of the forceps and lever, as some authors have done; for, contrary to the opinion maintained by them, among whom may be mentioned Bland, Lowder, Dennison, and others, I hold that no comparison can be justly made, for the reason that, in their operation, they are entirely different instruments—the one being a tractor, the other a corrector of malpositions. Whatever may be said in reference to the frequent necessity for the employment of the lever, I will merely state to you that, in the Dublin Lying-in Hospital, during the mastership of Dr. Collins, in sixteen thousand four hundred and fourteen deliveries, the lever was used but three times; and in the same institution, during the mastership of Dr. Shekleton, as reported by Drs. Sinclair and Johnston, in thirteen thousand seven hundred and forty-eight deliveries, the lever was resorted to but once!

How strangely do these statistics compare with what we are so much in the habit of hearing, in these latter days, of what occurs in the private practice of certain medical gentlemen, who speak of their almost daily use of the vectis, forceps, or crotchet, precisely as if a man's skill in the lying-in room is to be measured by the frequency with which he resorts to instruments! I believe in the converse of this proposition; to my mind, the truly skilful accoucheur rarely (comparatively, at least) employs instruments, for the obvious reason, that, in the first place, he is thoroughly imbued with a knowledge of the laws by which nature is regulated in the parturient effort; and, secondly, he is cognizant that, when not interfered

with by officious meddling, this same nature is generally adequate to the proper accomplishment of her work.

4. *The Forceps*.—I shall not occupy your time with the early history of this instrument, nor with the various modifications it has undergone from its first introduction to the attention of the profession. Suffice it to say that the obstetric arsenal, so far as the number and kind of forceps are concerned, is not only a vast armory, but has really become an institution in itself; and, indeed, it may be asked, with some degree of propriety, whether the interests of humanity would not have been more wisely served if some of the time employed in the construction and modification of this instrument had been given to the proper consideration of the more important question—*Under what circumstances and in what manner is the Forceps to be Employed?* If this question, I repeat, had received more mature deliberation, we should have been spared the numerous appalling examples of injury and death consequent upon the unbounded love, which some practitioners have for instrumental delivery. It is time that plain language should be spoken on this subject; the spirit of conservative midwifery seems to have been lost in sleep; the ordinances of nature have been disregarded, and the accoucheur, with instrument in hand, rampant in his desire for opportunity, rushes with good heart and unmeasured confidence to what he deems the scene of conquest; but too often, alas! it proves a scene of harrowing agony to the unhappy patient.

One would almost think that nature had become emasculated of her power, and that what were once considered her own admirable laws had been so changed, and she so utterly deprived of resources, as to render parturition no longer an act of hers—to be accomplished in her own inimitable way, and by her own consummate ordinances—but an act to be carried out according to the peculiar caprices of the accoucheur. Nature, gentlemen, is always the same so far as her own fundamental laws give her an identity; she is now in this particular what she was at the commencement of the world, whether as represented in the human family, in the animated tribes, or in the vegetable kingdom. I claim for her perfection of design and unequalled skill in the display of her own efforts, when not contravened either by morbid influences, or the officiousness of man. It must, however, be conceded that she sometimes needs assistance, but that assistance, in order that it may be serviceable, should be both justifiable and opportune.

Motives on which Forceps Delivery should be Based.—In the use of the forceps, I cannot too emphatically impress upon your recollection the necessity of keeping constantly in view two cardinal principles: 1. *A moral justification for its employment*: 2. *Such a use of it as shall secure, as far as may be, the maximum of good*

*viz. safety to both mother and child.** With these maxims to guide him, the accoucheur, in the retrospect of his professional life, will find nothing for self-rebuke, but much for congratulation in the conviction that, in this particular, he has faithfully discharged his duty to those who, in the hour of tribulation, looked to him for assistance. You, who have attended the obstetric clinic, where you enjoy such abundant opportunity of witnessing every variety of disease incident to women and children, have on more than one occasion had arrayed before you instances of the fearful results arising from the unnecessary use of instruments; and with the hope of impressing you by example as well as by words, I shall take the liberty of refreshing your recollection with a brief abstract in reference to the melancholy case of a married woman, who was brought before you not a long time since, in whom there was *complete occlusion of the meatus urinarius, with partial adhesion of the walls of the upper fourth of the vagina, together with a vesico-vaginal fistula,† produced by forceps delivery.* The following is the case, as reported in my work on the Diseases of Women and Children:‡

Mrs. R., aged 22 years, married, complains of inability to pass her water in the natural way, and says it runs from her nearly all the time through the front passage. "How long, madam, have you been married?" "Just twenty-six months, sir." "Were you a healthy woman before your marriage?" "Yes, sir; I never had a day's sickness, thank God!" "You have had a child, have you not?" "Yes, sir." "When was it born?" "Fifteen months ago, sir." "How long were you in labor?" "Three days, sir." "Was your labor severe?" "No, sir, but it was lingering." "Had you any one to attend you?" "Yes, sir, there were two doctors with me." "Was your child born alive?" "Oh! no, sir; the

* Prof. Meigs says: "The forceps is the child's instrument." I think the eminent Professor is disposed, in this maxim, to curtail the advantages of the forceps in a manner not endorsed by the experience of the lying-in room. So far, therefore, from circumscribing its benefits to the mere safety of the infant, I maintain that the *forceps is an instrument for both mother and child, and its true benefits are fully realized only when, through opportune application, it enables the accoucheur to save the lives of both parent and off-spring.*

† The employment of the forceps may, without a due degree of care, give rise to vesico or urethro-vaginal fistulas for the reason that sometimes great effort will be needed to cause the head to descend, being obstructed in its passage by the anterior wall of the pelvis; this effort necessarily falls more or less on the bladder and urethra, producing, if not fistulous openings, incontinence of urine from paralysis of the bladder, and other derangements. Still, it is well to recollect that these very difficulties may also arise from too long delay in a resort to the forceps, and may then be fairly chargeable to long-continued pressure on the parts, terminating in inflammation and ulceration. From these latter causes will sometimes arise a recto-vaginal fistula, more frequently, I think, than from the use of the instrument.

‡ Page 346.

poor little thing was all bruised, and its head was a good deal injured." "Why so, madam?" "The doctors did it, sir, with the instrument." "Then, you were delivered with instruments, were you?" "Yes, sir, indeed I was, and a poor sufferer have I been ever since!" "No matter, my good woman, do not deplore the past; you have been cruelly wronged, but we will endeavor to do something for you; at all events, we will make you more comfortable." "Thank you, sir." "Before your delivery, had you any trouble with your water?" "None in the world, sir." "How long after the birth of your child did you experience trouble in this way?" "Since the birth of my child, sir, my water has always troubled me. It runs from me, and I cannot help it!" "Did you call the attention of the doctors to this circumstance?" "No, sir, for they never came near me after I was delivered." "Then, madam, they did not do their duty." "Indeed, they did not, sir." "How long was it after the birth of your child that you left your bed?" "I could not go about, sir, for nearly six months." "Have you had your courses since your confinement?" "Only once, sir, about two months ago, and I thought I would have died from the forcing pain I had." "Did the usual quantity pass from you?" "No, sir, very little, indeed."

This case, gentlemen, exhibits another of the many instances of professional cruelty more or less frequently occurring in this populous city; and it is, indeed, needful that something should be done to arrest the reckless temerity of men calling themselves physicians, who, if we are to judge them by their acts, place a very insignificant estimate on human life. But the melancholy feature of the whole business is, that these assaults on health and life are made under the protection of a diploma, and, therefore, are perfectly within the record! No! a diploma, though it may serve the purposes of the holder, is insufficient to justify the moral wrong of the sufferings, the details of which have just been narrated. A diploma without knowledge is a curse to its possessor, and a fearful instrument of destruction to the community. With knowledge, too, must be conjoined a refined morality based upon that Christian principle—"Do unto others as you would wish others do unto you!"

This poor woman, whose health was her only capital, whose daily bread was the product of her daily labor, has become involved, either through ignorance or unpardonable carelessness, in a complication of maladies which, even if measurably relieved, will cause her more or less distress during her entire existence. The first question, which naturally presents itself to the mind in viewing the serious afflictions of the patient, is this: What has produced this state of things, and could it by a proper exercise of judgment have been avoided? She was delivered with instruments, and to their unskilful and unnecessary employment are to be referred all her

present difficulties. There is no evidence before us that the use of instruments was at all indicated. The patient observed that "her labor was not severe," it was "only lingering." She, then, has fallen a victim to that "hot haste," which unfortunately too often prevails in the lying-in chamber, or to that undying fondness, which some men cherish for operative midwifery. Let this case be a lesson to you; think of it in your hours of meditation, and may it prove a shield to those who confide their lives to your custody. In the eye of Heaven, murder loses nothing of its atrocity because concealed from the ken of human observation; so it is with the dark deeds of our profession. The diploma may afford a mantle, so far as earthly jurisdiction is concerned, but the time of reckoning will come with appalling retribution!

You are, however, gentlemen, not to misunderstand me; I condemn only the abuse of the forceps, and desire to admonish you that while in it you have, when properly employed, a means of accomplishing great good, yet, in reckless and unskilful hands, it is indeed an instrument of fearful destruction. On the one hand, it will enable you to save the lives of both mother and child, and rescue them from the dread consequences of embryotomy. On the other, it will oftentimes lead to the death of parent and offspring; or if, peradventure, the former should survive, she will have entailed upon her troubles to which death itself is frequently preferable—such, for instance, as vesico-vaginal, urethro-vaginal, recto-vaginal fistulas, rupture of the uterus, and other lacerations of the soft parts, often the sad consequences in the practice of those gentlemen, who are in the habit of resorting to instrumental delivery without cause or justification.

Prior to the introduction of the forceps in operative midwifery it was the usual practice, in all cases of difficult parturition in which the hand was unable to overcome the obstacle, to destroy the child and bring it away piecemeal by means of hooks, etc. Therefore, while I most cordially admit that I regard the forceps, under proper employment, as one of the undoubted boons, which science has placed within the reach of the conscientious and skilful accoucheur, yet it would be an interesting inquiry—if the statistics could be fairly gathered—whether, in consequence of its reckless use, the good derived from the employment of this instrument has not been more than counterbalanced by the evil it has inflicted. It is a maxim of the assassin that "*dead men tell no tales*;" is it not equally true that those practitioners, who destroy their patients by the rude and unjustifiable use of instruments, are very much disposed to allow their deeds of blood to accompany their victims to the grave, where, amid the silence of death, they may find shelter from the public gaze! Hence, the true difficulty of arriving at reliable statistics on this point.

I trust I may be pardoned for the plain and emphatic manner in which I write on this important question; but I feel that I have a sacred duty to discharge to you, and also to those, who, after you shall have left this University, will look to you for counsel and aid in the time of their anguish. But a short while since, at the request of one of those truly good women, "a sister of mercy," I visited in a miserable hovel a poor creature, who had been attended in her confinement by a medical man, who found it necessary to call to his aid two of his professional friends. The woman had been in labor only six hours, when it was deemed necessary to resort to the forceps; she was delivered of a dead child with the right *os parietale* crushed, and the corresponding eye forced out of the socket! The unhappy mother had only been delivered four hours when I saw her; she was at that time vomiting, her face pale and haggard, with a pulse extremely rapid. I requested the physicians to be sent for, but they could not be found! On an examination, I detected a rupture of the neck of the uterus,* and the poor creature was soon released from her sufferings, having expired just fourteen hours from the time her labor commenced!† What better

* I may refer the reader to the prize essay on *Rupture of the Womb*, by Prof. James D. Trask, M.D., for some extremely interesting facts. His monograph is the most complete we have on the subject. His observations are based on over four hundred cases, which he has variously collected. The paper will be found in the *American Journal of Medical Science* for January and April, 1848. The following extract touching the results of treatment in this formidable complication will be read with interest:

We formerly showed that the average duration of life, after rupture, with those delivered, was *twenty-two* hours; and that of the *undelivered*, but *nine* hours. By adding to these the new cases, we find that, of those *delivered*, *fifty four* per cent. survived beyond *twenty-four* hours; while of those dying *undelivered*, *twenty seven* per cent. survived beyond the same period.

Relative success of different modes of Treatment when the Head and the whole or part of the Body has escaped into the Peritoneal Cavity.

SUMMARY OF ALL THE CASES.

Gastrotomy saved,	16,	lost,	4,	or	20	per cent. lost.
Turning, &c.	"	23,	"	50,	or 68.5	" "
Abandoned	"	15,	"	44,	or 75	" "

Relative success of different modes of Treatment when the Pelvis is Contracted.

SUMMARY OF ALL THE CASES.

Gastrotomy saved	6,	lost	3,	or	33	per cent. lost.
Perforation, &c. saved	15,	"	30,	or	65	" "
Abandoned	"	0,	"	11,	or 100	" "

Adding together these two classes, we get, as the comparative results of the different modes of treatment—

Gastrotomy saved	22,	lost	7,	or	24	per cent. lost.
Turning, perforation, &c. saved	38,	"	80,	or	68	" "
Abandoned	"	15,	"	55,	or 78	" "

† This woman had previously borne two living children at full term; her parts were normal, and her mangled child presented the ordinary proportions; and yet, after a labor of six hours, the forceps was deemed the sheet-anchor of hope!

comment, gentlemen, can I make on conduct like this, than simply cite it as an admonition when you shall have entered on the mission of practical duty, and become responsible not only for your own reputations, but for the lives of your patients, who may confide both in your honor and skill. I will not weary you with the narration of kindred examples of cruelty, which I have witnessed—for the heart sickens, and the mind grows restive under the contemplation of such deeds of iniquity.

A distinguished professional friend from the West, in speaking of the *monomania*, which sometimes spreads among medical men in reference to certain peculiarities of practice, told me that some years since there prevailed in the valley of the Mississippi an almost universal belief that *cathartics* constituted the great remedy for the cure of disease; in accordance with this general conviction, a doctor was in the habit of placing himself on the bank of the river, and as the people passed by, they were saluted with these words, "How are your bowels to-day?" Indeed, I am not so confident that we have not a *monomania* of a different sort among us here; and it would not be strange if the gravid female passers-by should one of these days be greeted thus: "Safe delivery insured by instruments!"

Statistics of Forceps Delivery—Frequency.—Dr. Churchill* gives the following details: Among British practitioners, 594 forceps cases in 167,648 labors, or about 1 in 249.

In France, 339 forceps cases in 47,475 labors, or about 1 in 140.

In Germany, 7074 forceps cases in 755,593 labors, or about 1 in 106½.

Taking the aggregate of these cases, the forceps was employed 8007 times in 850,713 cases, or about 1 in 106½.

Mortality to the Mother.—As far as could be ascertained, in 812 forceps deliveries, among British practitioners, 38 mothers were lost, or 1 in 21½. Among the French and Germans, in 4941 cases, 142 mothers were lost, or about 1 in 34.

Mortality to the Child.—In Great Britain, in 694 cases, 142 children were lost, or about 1 in 5; and according to the statistics supplied by the Continent of Europe 858 children were lost in 5037 cases, or about 1 in 5¾.

The total result is that, in 5753 forceps cases, 180 mothers were lost, or about 1 in 32; and in 5731 cases, 98 children were born dead, or about 1 in 5; now, if we turn from the larger aggregates as furnished by Dr. Churchill, to other sources confined more to individual practice, we shall have very different results.

In the Edinburgh Maternity Hospital, there were 1475 women delivered under the superintendence of the Institution; among these were 58 miscarriages or premature labors, being 1417 labors

* Churchill's Midwifery, fourth London Edition, p. 344.

at full term ; in these 1417 cases the forceps were applied 3 times or 1 in 472. Among the 1475 women delivered under the superintendence of the hospital (374 were delivered at the hospital, and 1101 at their own homes), there were 11 deaths, or 1 in 134.*

In the Royal Maternity Charity of London, Eastern Division, under the supervision of Dr. Barnes,† in 2416 deliveries at the homes of the patients, the forceps was resorted to 6 times, or 1 in 401 ; deaths 7, or 1 in 345.

In the same Institution, Western District, under the charge of Dr. J. Hall Davis, in 7371 deliveries at the houses of the patients, the forceps was applied 6 times, or 1 in 1220 ; deaths 18, or 1 in 456.375.‡

It is, I am sure, quite unnecessary to refer to additional statistics in proof of what I am anxious to demonstrate, viz. that the records of private practice among medical men of judgment and skill exhibit very different results, both in the frequency and mortality of forceps delivery, from those presented by the mixed statistics of hospital and out-door deliveries.

What is the True Power of the Forceps ?—Accoucheurs are divided in sentiment on this subject ; some maintaining that it acts principally as a compressor, diminishing the volume of the head, and in this way facilitating its passage into the world. That the forceps, under certain conditions, is capable of diminishing the transverse diameter of the foetal skull, is a question about which there can be no doubt ; but this diminution is only relative, and cannot, I think, exceed more than three or four lines without seriously compromising the life of the child ;§ so that, it must be remembered that the forceps as a mere *compressor* becomes deprived of much of its value as an instrument intended, under ordinary circumstances, and with judicious application, to save the lives of both parent and offspring. Again : the great majority of cases in which the use of the forceps is indicated will be those in which no compression is needed, as we shall more particularly mention when speaking of the indications for forceps delivery. Therefore, I think it right that we should refer the true excellence of the instrument to its extractive properties.

* Simpson's *Obstetric Memoirs*, vol. i., p. 854.

† *Dublin Quarterly Jour. Med.*, Aug. 1859, p. 99.

‡ *Difficult Parturition*, by J. Hall Davis, 1858, p. 272.

§ When describing the foetal head, I told you that, in consequence of the overlapping of the two parietal bones, the head, during its progress through the pelvis, could be diminished, without harm to the child, to the extent of six lines or half an inch. This is really so ; but you will bear in memory the marked difference between the two forces employed. In the one case, the force is derived from the energetic and continued contractions of the uterus, gradually accomplishing the desired diminution in certain instances of relative disproportion ; in the other, on the contrary, the force is artificial, and cannot, with whatever skill it may be exercised, equal in salutary effect the efforts of nature herself.

It is, indeed, a tractor of precious value, and this, in my judgment, constitutes its chief attribute. The instrument should be regarded as simply an aid to nature, for it is only under one of two circumstances, as I shall more particularly state to you, that its application becomes justifiable, viz. 1. When nature, exhausted in ineffectual effort, is unable to accomplish delivery; 2. When, in consequence of certain complications, the lives of mother and child would be compromised by delay.

In one word, *the forceps as a tractor becomes, as it were, a substitute for the uterine contraction necessary to expel the child. Therefore, in all particulars, it should be made as rigidly as possible to simulate, through extractive force, the uterus as an expulsor.* I think I am right in this general proposition, and if you will, in the first place, accept it, and, secondly, suffer it to constitute the basis of conduct in cases in which delivery by the forceps may be deemed advisable, I shall predict with great confidence that the instrument, in your hands, will cease to be one of destruction, and will prove of abiding service to your patients. There is one other advantage offered by the forceps which I should not omit to mention: besides enabling us to extract the child, it will afford the facility of changing an unnatural into a natural position of the head.

Dangers of Forceps Delivery.—It is right that we should here allude to some of the evil consequences occasionally resulting from the use of the instrument. Instances are recorded in which, especially where there was slight contraction, the bones of the pelvis have been fractured by the amount of force employed, or a separation of the different symphyses, together with laceration of the ligaments. These accidents, however, should be regarded as among the comparatively rare consequences. Injuries to the soft parts are much more common. Rupture of the uterus or vagina, laceration of the perineum—by no means unfrequent results of forceps delivery—thrombus of the vulva, pelvic abscesses, prolapsus of the womb, etc., may be counted among the sequelæ of the use of the instrument, when sufficient care has not been developed in its application. The child, too, may suffer from contusion, fracture of the bones of the cranium, or congestion of the brain.

To what Part of the Child should the Instrument be Applied?—It was formerly recommended, and the practice still obtains with some practitioners, to apply the forceps in certain cases of breech presentation—Smellie and Dr. Collins were two earnest supporters of this practice. I must confess that to attempt to extract the child by grasping its breech with the forceps appears to me, not only unwise, but most certainly calculated, if not positively to destroy its life, at least to entail upon it very serious injury. To become satisfied of this, it is only necessary to remember the anatomical conformation of the hips of the fœtus, the more or less cartilaginous

condition of its pelvis, together with the want of correspondence between the general physical volume of the breech, and the peculiar shape and curves of the forceps; the recollection of these circumstances will at once cause you, I think, to appreciate the important practical truth that the forceps cannot, with due regard to the safety of the child, be employed in cases of breech presentation. Besides, even if, under the circumstances, the instrument were at all admissible, there is another objection to its use, viz. it cannot present the same advantages for the extraction of the child as either the fillet, the blunt hook, or the finger of the accoucheur applied to the bend of the thigh. Therefore, I would advise you, for the reasons just stated, never to have recourse to the forceps in this presentation. When the instrument is used, it should be applied exclusively to the head, and this may be done under two different conditions, viz., 1. When the head presents first; 2. After the delivery of the child, the head remaining in the pelvis.

How is the Head to be Grasped by the Forceps.—Except in certain extremely rare cases, the instrument should be so applied as to seize the head thus: the internal surface of each blade of the forceps (the cranial curve) should be so adjusted as to be in correspondence with each *os parietale*, and extending on either side in the direction of the *occipito-mental* diameter of the head. Seized in this way, there will, as a general rule, be no danger of injury to the child; and, in the event of its being necessary, the proper degree of compression can be exercised so that the parietal bones may be made to overlap; and what is extremely essential, the head being grasped in this manner, the forceps, under the judicious manipulations of the accoucheur, will be better able to display its full power as a tractor, and bring the head into the world in accordance with the principles regulating the mechanism of labor; for remember, *the forceps being a substitute for the natural forces, should, in every particular, be made to imitate as far as may be these very forces when not disturbed by some contravening influence.*

Modifications of the Forceps.—The instrument, as originally presented, has undergone numerous changes depending upon the caprice or judgment of the innovator; I shall not weary you with a recital of these multiplied alterations, but shall content myself with simply remarking that the forceps, as now used, exhibits two curves: one of these is known as the *cranial* curve, intended to adapt itself to the shape of the child's head; the curves present two openings or fenestra, which accommodate themselves to the parietal regions of the foetal cranium. The instrument with the cranial curves is the one known as Denman's or the short-strait forceps; as this was intended to seize the head only when it had well descended to the inferior strait or outlet, the one curve for each blade (the cranial), answered the purpose well enough; but it was soon found that the

forceps so constructed was not adequate to the wants of the accoucheur, when instrumental delivery was called for before the descent of the head had been accomplished; and we are, therefore, indebted for another important modification of the instrument to those distinguished accoucheurs, Smellie and Levret. The modification to which I allude consists in an additional curve, described as the pelvic curve, the convexity of which regards the sacrum, while the concavity is turned towards the pubes. It is, as you perceive, in perfect correspondence with the two axes of the pelvic cavity, and, as is manifest, has special relations to the organs of the mother; the cranial curve, on the contrary, has reference to the child only. The instrument with the curves just noticed is known as the long, the medium, and the short forceps. The latter, I have already remarked, is limited to delivery after the head is pressing on the perineum, while the two former may be employed for the extraction of the head, not only when it is at the outlet, but in any portion of the pelvic cavity, or at the superior strait.

The Author's Obstetric Case.—I present my own obstetric case of instruments, consisting of the forceps, the guard crotchet, the vectis, and pierce-crane or perforator. Fig. 83 represents my forceps, which, I believe, embodies some important improvements. The curve of the blades, their lightness, and thinness (sufficiently strong, however, for all ordinary purposes), I regard as a very essential improvement. The blades of the forceps are usually too thick, unnecessarily so; this circumstance frequently prevents their introduction, especially if the head be more than ordinarily large, or the pelvis somewhat contracted. In my judgment, therefore, the thinner the blades, consistently with the strength required, the more advantageous will the instrument be found. Instead of the pivot lock, I have substituted the button joint, and the advantage of this mode of articulation over the pivot will be at once conceded on testing the relative facility of locking the branches of the instrument. It appears to me that accoucheurs generally have paid too little attention to the handle of the forceps: I certainly do attach much value to this portion of the instrument, and I am satisfied that the indifference of practitioners to it has oftentimes led to failure in its just workings.

In order to extract the head of the fœtus safely, something more is needed than the mere adjustment of the blades; for if proper traction be not made, and proper *direction* given to the traction, the child will frequently be sacrificed, and more or less severe injury ensue to the soft parts of the mother. To obviate these difficulties, therefore, and to furnish every facility for the safe extraction of the child, I have provided a handle (Fig. 84) of sufficient length and curve. The curve at the extremity of the handle will afford greater facility to the operator, and give him

more power than any forceps I have yet seen. To be satisfied of this fact, it is only necessary to test it by application of the instrument on the manikin. The length of the handle likewise affords a proper lever for the traction. The two rings (Fig. 83) will enable



the operator to give proper direction to the force employed, and will, at the same time, facilitate very much the lateral movements so essential to impart to the child's head during the stages of its delivery.* Fig. 85 represents the ordinary pierce-crane or perforator; Fig. 86 the ordinary vectis or lever.

The crotchet, which is usually employed in operative midwifery, is, in more senses than one, a murderous instrument, and has been followed by melancholy results. Under the most favorable circumstances, and in the most dexterous hands, it often does harm. It is well understood that it is never to be resorted to except in cases in which embryotomy is indicated. Its chief danger, therefore, regards the mother, for the reason that the purchase which this instrument takes on the child almost always gives way, and if the accoucheur be not particularly circumspect, the soft parts of the parent—the uterus, the bladder, rectum, or vagina, will be more or less lacerated, often giving rise to disastrous consequences. With

* After long trial, I can speak with much confidence of the forceps described in the text; and I have the authority of our principal instrument makers for stating that they receive more orders for it than for any other forceps manufactured by them.

a view of obviating this destructive tendency of the instrument, I have caused a guard-crotchet (Fig. 87) to be constructed, which I offer to the attention of the profession, allowing its merits to rest upon the judgment they may form of its utility. The adaptation of this instrument to the particular indications to be fulfilled in the use of the crotchet will, I think, be found to be all that can be desired. Fig. 88 presents a front view; in the centre of the blade is a groove for the reception of the guard, which is made to slide with facility to the point of the crotchet. The extremity of the guard (Fig. 87), on its external surface, is convex and smooth, and so completely conceals the sharp point of the crotchet as entirely to protect the soft parts from injury, even if the instrument should slip during the tractions made on it by the accoucheur; for, in this event, instead of the vagina, bladder, or rectum being lacerated by the point of the crotchet, they will suffer no injury, for the smooth surface only of the guard comes in contact with them. It will be seen that, at the other extremity of the guard, there is the ordinary blunt hook. This is important merely as a matter of economy.

It is due to myself to state that these instruments are not presented from any fondness I have for fame as an *inventor*; my ambition lies in a different direction. But they are the result of much reflection, and all I ask is that they may receive that degree of favor to which, on fair trial, they may be found legitimately entitled.

Indications for the Use of the Forceps.—In considering the indications for the employment of the forceps, we approach one of the most important topics connected with the entire science of midwifery; and it is right that we should award to this question a due degree of appreciation. As one of the essential prerequisites for a resort to the instrument, it is absolutely necessary that nature should be at fault. It, therefore, remains for us to examine what the circumstances are which so far contravene her efforts as to need the interposition of science. These circumstances may be enumerated as follows:

1. A contracted pelvis;
2. A normal pelvis with the head larger than usual;
3. Defective parturient action, embraced under the general term of inertia;
4. The presence of some serious complication, such as hemorrhage, convulsions, exhaustion, hernia, or prolapsion of the cord;
5. Rupture of the uterus, the head being in the pelvic cavity, or fixed at the superior strait;
6. The occurrence during labor of any circumstance which may place in jeopardy the life of the mother or child.

With regard to the application of the forceps, in case of defective pelvic capacity, I am decidedly of opinion that if there be not a

space of three inches and an eighth in the antero-posterior diameter at the upper strait, and the same in the transverse diameter at the lower or perineal strait, a living child at full term with its ordinary dimensions cannot be extracted; and, moreover, any attempt to do so would more or less seriously compromise the integrity of the soft parts of the mother, if, indeed, it did not subject her life to peril. Some of the most melancholy results of forceps delivery are to be found among those instances of pelvic contraction, in which mere animal force has been employed with the delusive hope of overcoming the physical disproportion, and thus accomplish the labor.

The Time of Resorting to the Forceps.—I cannot too emphatically admonish you against the danger of blind obedience to some of the lessons inculcated by certain distinguished writers as to the *time* of resorting to the forceps. You have just been told that the use of the instrument will sometimes be indicated when there exists not the slightest disproportion between the fœtus and maternal pelvis. The labor, for example, to a certain period, may have been perfectly natural, and all things have gone on well until the head reaches the inferior strait. At this stage of the labor, either convulsions, hemorrhage, exhaustion, rupture of the uterus, etc., may occur, and render immediate delivery absolutely necessary. It is important, therefore, that the rule for artificial delivery, under these circumstances, should be clearly understood, and the doctrine advanced by some of the older English authorities on the subject fairly examined. I cannot but regard the direction given by these authors, with regard to the particular *time* of applying the forceps, as fraught with evil, not only to the safety of both mother and child, but also to the reputation of the medical man.

Dr. Merriman,* one of the ablest accoucheurs of modern times, observes—"No case is to be esteemed eligible for the application of the forceps, unless the ear of the child can be *distinctly* felt; so careful have the best professors of midwifery been to guard against an improper use of the instrument, that it has been laid down as a *rule of practice*, that the *forceps should never be applied until the ear of the child has been within reach of the operator's finger for at least six hours.*" Dr. Denman, than whom no one has left a more merited reputation, says—"A practical rule has been formed, that the head of the child shall have rested for *six hours* as low as the perineum, that is, in a situation which would allow of its application, before the instrument is applied, although the pains should have altogether ceased during the time." It is unnecessary to enumerate more authorities in support of this principle. Suffice it to say that the dicta of Denman, Merriman, and others, have taken

* Synopsis of the Various Kinds of Difficult Parturition. By Samuel Merriman, M.D., F.L.S. London, 1820, p. 156.

a strong hold of the English school, and their opinions have been too generally adopted. You will permit me to say that either of the precepts which I have just cited, if universally carried out, cannot but result oftentimes most seriously to mother and child, viz. *that the "ear should first be felt, and that the head shall have rested for six hours as low as the perineum."* In the first place, I would observe, my own experience teaches me that it is not always an easy thing to reach the ear, even when the head is at the inferior strait; and, secondly, not to interpose until the head shall have pressed upon the perineum for *six hours* will prove, in many instances, pernicious practice.

To illustrate this point, let us suppose that the head is in the pelvic cavity; the mother suddenly becomes exhausted, either from hemorrhage or antecedent effort, or it may happen that the labor becomes complicated with convulsions. No matter what the special cause may be, we will hypothecate that, from the imminent danger, immediate delivery is absolutely indicated. The accoucheur introduces his finger, and endeavors to reach the ear; he does not succeed; the patient's situation becomes more and more alarming; he again makes the attempt to find the ear—he fails; his own judgment tells him, indeed everything clearly indicates that the forceps should be applied; *but he cannot reach the ear!* He delays in the hope that *"the head may come down in the pelvis sufficiently low to enable him to feel one or both ears distinctly."* Alas! this proves fallacious. The assistants supplicate him to do something to relieve the patient, for they see she is dying; and what will it avail, under these sad circumstances, for him to exclaim: "I can do nothing, *for the ear of the child cannot be felt!*" Let it not be imagined that this is an overdrawn picture; such results must inevitably ensue from an adherence to the rule to which I have just alluded. It is further alleged that "it is necessary to reach one or both ears, because they become the guides to the proper adaptation of the blades." This language, I must confess, surprises me not a little. If there be any meaning in it, it is simply this—that unless the ears be felt, it will be impossible to know how to arrange the blades of the instrument, because of the ignorance of the accoucheur as to the position of the head. Admitting the truth of this reasoning, when the head is at the inferior strait—which I most unequivocally deny—how is the position to be ascertained when the head is still at the pelvic brim? Certainly not by feeling the ears, for these cannot be recognised once in a thousand times previously to the descent of the head into the cavity of the pelvis. The position of the head can be told both at the inferior and superior straits by the direction of the fontanelles, sagittal suture, etc.; and these will indicate the manner of applying the forceps, and seizing the head in its bi-parietal measurement.

But again: "The head has not been pressing on the perineum for six hours;" what is to be done in this case, when the life of either mother or child is menaced, and immediate delivery called for? Are you, with watch in hand, to say to the earnest appeals of surrounding friends—"Oh! I cannot interfere yet; I am waiting for six hours to elapse!" You perceive, gentlemen, the absurdity as well as the danger of the two rules to which I have referred; and you will allow me most emphatically to enjoin on you to pay no regard whatever either to the ear or the length of time the head may be in the excavation; but, if all other things be equal, proceed to artificial delivery the moment the safety of mother or child becomes seriously endangered. The very essence of forceps delivery, that which commends itself so strongly to our consideration, is the ability with which it oftentimes enables us to rescue both mother and infant. Therefore, if artificial delivery be indicated, *have recourse to it before the life of the child has been sacrificed, or the vital forces of the mother so far expended as to render her recovery extremely doubtful.* I do not advocate a meddling midwifery; on the contrary, you will all bear witness that I am essentially conservative; but I do most strenuously recommend, when indicated, such an opportune application of the means put into our hands of affording relief as will achieve the highest measure of good to both parent and offspring.

Perhaps, you may think it important that I should enter somewhat in detail as to *how* you will be enabled to recognise that either the mother or child is in danger. All that I have to say in reply is, that the accoucheur, if he thoroughly comprehend the principles of his science, will through the proper exercise of his judgment readily arrive at a just diagnosis as to the propriety of action. For example, he must distinguish between positive and relative exhaustion; he must appreciate, in an attack of convulsions or hemorrhage, whether immediate delivery be indicated or not. Is the pressure on the head of the child from long-continued effort of the uterus such as to compromise its safety, thus calling for interference? In cases of funis presentation, under what circumstances will the forceps be justified? If the uterus be ruptured during the parturient effort, and the head in the pelvic cavity, would not delivery by the forceps add to the feeble chances of the mother's recovery?

All these are questions which must be determined, not in the lecture-hall, but at the bed-side of the patient; it will be a question of evidence, and that evidence will depend upon the surroundings of each case as they may present themselves to your observation. In one word, the problem to be solved is this—can nature accomplish the delivery consistently with the safety of parent and child, or will the interposition of science be needed? *Nec temere, nec*

timide—neither rashly nor timidly—is the maxim which should govern the accoucheur in cases of forceps application; and while I would enjoin to its fullest extent the observance of caution, yet I cannot but impress upon you, as worthy of recollection, that so far as regards the general result it is far better, in dexterous hands, that the instrument should be employed *five minutes too early than five minutes too late*.

LECTURE XXXIX.

Forceps Delivery continued—Rules for the Application of the Forceps—The instrument may be employed when the Head is at the Inferior Strait, in the Pelvic Cavity, or at the Superior Strait.—The Head at the Outlet, with the Occiput toward the Pubes, and the Face in the Concavity of the Sacrum—The Head at the Outlet in a Reverse Position—The Head in the Pelvic Cavity diagonally, the Occiput regarding the Left Lateral Portion of the Pelvis, the Face at the opposite Sacro-iliac Symphysis—The Head in the Pelvic Cavity diagonally, with the Occiput at the Right Lateral Portion of the Pelvis, and the Face at the opposite Sacro-iliac Symphysis—The Head in the Pelvic Cavity in Positions the reverse of the two preceding—Application of the Forceps, the Head being at the Superior Strait—Positions of the Head at this Strait—Difficulties of Forceps Delivery when the Head is at the Upper Strait—Version, in such case, preferable—Case in Illustration—Rules for Forceps Delivery, the Head being at the Superior Strait—Locked-Head—What does it mean?—Want of Concurrence among Authors as to what Locked-Head is—Is Locked-Head of Frequent Occurrence?—Camper's Opinion—Dangers of Locked-Head to the Child and Mother—Under what Circumstances may Locked-Head occur?—Application of the Forceps in Locked-Head—Rules for.

GENTLEMEN—We shall now consider the rules to be observed in the application of the forceps, after you have decided that the use of the instrument is indicated. Permit me, however, to premise that forceps delivery may be resorted to under the following circumstances :

1. The head being at the inferior strait.
2. In the pelvic cavity at any point between the two straits.
3. At the superior strait.
4. After the trunk of the child has been delivered, and the head remains either at the brim, in the pelvic cavity, or at the outlet.

We will suppose that you have fully determined, according to your best judgment, that the alternative for the safety of either mother or child is a resort to the forceps ; this opinion would necessarily, if it be a just one, presuppose that you had, through a proper vaginal examination, become informed of the exact relations of the head to the pelvis. Having, therefore, decided as to the propriety of artificial delivery, I will now mention what I deem the elements essential to a successful accomplishment of the operation after the head has descended into the pelvic cavity :

1. The full consent of your patient must be had, and this can

readily be obtained if the accoucheur will only exercise a little adroitness. There is a cord in woman's heart, which if properly touched, will always prove responsive. Talk to her thus: Madam it is my duty to say to you that if your delivery be longer delayed your infant will incur very serious hazard of its life, and the time has now arrived when, if I act promptly, I shall be enabled to save your child, and spare you much protracted suffering. Oh! dear doctor, but will not the instrument destroy my poor child? So far, my good friend, from harming it, the forceps will enable me to bring it into the world without inflicting the slightest injury upon it, and if it be alive when I commence the operation, of which there may be a possible doubt in consequence of the very severe pressure its head has undergone, I think I can very confidently promise you that the instrument will be the only means of enabling me to save your child. Oh! doctor, then do not delay. I will submit to anything to have my child alive!*

2. The position of the patient is of much importance; and I greatly prefer that she remain on her back rather than on her side, occupying the precise attitude which has already been described when speaking of version, viz. let her hips be brought to the edge of the bed, placing a double fold of linen or flannel under them in order to have them on a plane surface; an assistant should be seated on either side, whose duty it shall be to flex the thigh and leg at a right angle allowing the foot to rest on his knee, one of the hands being placed on the knee of the patient, while the other gently seizes the foot, for the purpose of steadying it. The accoucheur, with an apron to protect his dress, seats himself on a low chair between his two assistants. The bladder and rectum, if distended, should be relieved of their contents.

3. There is no necessity for any exposure of the patient's person, and this injunction should be scrupulously observed.

4. The *os uteri* should be sufficiently dilated and relaxed, as also the vagina and vulva to allow the head to pass; otherwise, there would be the serious hazard of formidable and disastrous lacerations. To attempt to introduce the blades of the forceps into an undilated *os* would, in my opinion, be but the probable passport to the death of the patient; for, admitting the possibility of introducing the instrument, would not the tractions necessary for the deli-

* I am in the habit of having recourse to a very simple, and at the same time effectual mode of dispelling all apprehension from the mind of the mother in reference to any supposed injury or mutilation of the infant from forceps application. It is this: I ask her to double her two hands together, and I then place them within the blades of fenestra of the instrument; now, madam, I tell her, your hands represent the head of the child; do you feel any pain from the instrument? Not the slightest. Neither will your child experience any pain or injury. Why, doctor, she will exclaim, you astonish me—I always thought that when instruments were employed the head of the child was dreadfully crushed!

very of the head, be almost certainly followed by rupture of the cervix?

5. Previously to introduction, the blades should be separated, placed in a vase of warm water, and then properly lubricated with oil, fresh butter, or lard.

6. In order to ensure the proper application of the forceps, without injury to either mother or child, it is essential that the instrument be introduced so that the cranial and pelvic curves of the blades correspond with the convexity of the head, and the concavity of the pelvis.

7. The introduction of either blade should always be preceded, if the head have not entirely escaped beyond the mouth of the uterus, by three fingers gently carried into the vagina, and cautiously insinuated between the head and uterine orifice; this I hold to be one of the fundamental rules in forceps delivery, for two important reasons: In the first place, you will be enabled by this rule properly to adapt the blades to the portion of the cranium to which they should be applied; and, secondly, there will be no risk of injuring the cervix of the organ with the extremity of the instrument, which would almost certainly be the case without the precaution just named. If, however, the head should have completely freed the cervix, and rest in the vagina, then it is not necessary to carry the fingers within the cavity of the organ, but care should be taken that the extremity of either blade be so adjusted on the sides of the head that no injury be done to the mouth of the uterus; and to accomplish this, let the fingers be carried up as far as the cervix, so that this may be guarded against violence.

8. Except when the occiput corresponds with the left lateral portion of the pelvis, the male branch should be introduced first.

9. At the time of introduction, the accoucheur should gently seize one branch of the instrument (the male branch with the left hand, the female branch with the right), so that the thumb shall be applied on the convex surface, midway between the extremity of the handle and blade (Fig. 89), while the middle and ring fingers grasp the branch on the concave surface just below the ring,



FIG. 89.

with the index finger applied upon the outer portion of the ring itself.*

10. The introduction must be made during the interval of uterine contraction; and before making any attempt to introduce the branch thus seized, I am in the habit of placing the instrument in such way that it shall be nearly parallel to the axis of the body (if the male branch, the parallel will be on the right side; if the female, on the left side); then the extremity of the blade is to be pressed on the palm of the hand already introduced into the vagina (Fig. 89), and in proportion as it penetrates the vagina, the handle of the instrument is brought toward the operator.

11. Remember that, in the introduction of the forceps, nothing will justify brute force; should there be some slight impediment to its passage, let the accoucheur employ his judgment, and not violence, and with a little skilful manipulation the obstacle will, under ordinary circumstances, be readily removed.

12. The head should, as a general rule, be seized in the direction of its occipito-mental diameter, for in this way the greatest possible facility will be afforded for its safe extraction. It is a grave error to suppose that the blades should invariably be applied on the sides of the pelvis; *it is the position of the head, as will hereafter be shown, which is to decide the position of the blades.*

13. When one branch has been properly introduced, it is to be intrusted to an aid, who takes it by the handle (Fig. 90), and holds it steadily, for the slightest movement will oftentimes embarrass the



FIG. 90.

operator. The other branch is then introduced upon precisely the same general basis (Fig. 90); when it has embraced the head, the accoucheur then takes the handle of the branch which has been intrusted to the assistant, and by judicious manipulation will be

* Let the student accustom himself, by frequent trials on the manikin, to seize the instrument in the manner described, and he will, I am sure, find great advantage in following the rule at the bedside.

enabled to bring the two handles in juxta-position, which constitutes what is known as *locking the forceps*, a very essential, and, in my opinion, the most important part of the entire operation; for if the instrument lock, the proof is positive that it has been correctly applied.

14. After the instrument is locked (Fig. 91), many accoucheurs recommend that the handles should be kept closely in union, and, for this purpose, they resort to a napkin for the purpose of binding them together. This, as a general rule, is bad practice, and should be had recourse to only in case of diminished pelvic capacity, when it becomes important to lessen the volume of the head by more or less powerful pressure.



FIG. 91.

15. The force employed for the purpose of delivering the child should be compound, consisting of *two thirds lateral and one third extractive*; and with this object, the right hand should, with its

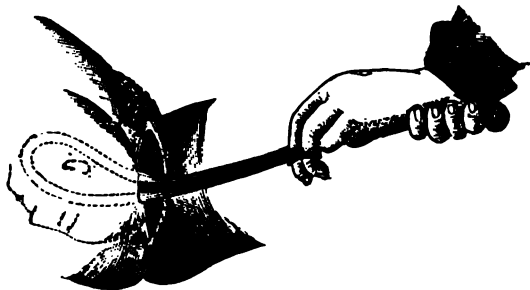


FIG. 92.

dorsal surface upward, be made to seize the handle, while the index and middle fingers of the left hand (Fig. 92) are placed in the two rings of the instrument; occasionally, in the absence of pain, the fore-finger should be introduced into the vagina in order to ascertain the progress of the head.

16. The traction is to be made only during a pain, or while the uterus is contracting; after the contraction, the effort should cease until another recurrence of the pain; and, during the interval of pain,* the handles should be slightly separated in order that the head may be liberated from any undue pressure.

* If anesthetics be had recourse to, the pains will usually be more or less absent; and, in this case, the rule of making traction only during a pain does not obtain. There will also be an exception to the rule, when, in consequence of some serious and pressing complication, prompt extraction of the child is indicated.

17. As soon as the head begins to protrude at the vulva (if the occiput correspond with the symphysis pubis), the handle of the forceps should be successively but gradually elevated (Fig. 93), for



FIG. 93.

the purpose of producing the movement of extension, or bringing the chin from the sternum, so that when the head has completely

escaped through the vulva, the handles of the instrument will describe a right angle with the abdomen of the mother (Fig. 94). Should, however, the face correspond with the symphysis pubis, the direction to be given to the instrument will be precisely the reverse, and, consequently, the head being delivered, the handles of the forceps will be at a right angle with the spinal column.

18. Care must be taken to make proper pressure on the perineum, as soon as the head begins to distend it.

19. When the head has been extracted, the instrument is to be removed, but

this needs some caution; for example, the forceps should be unlocked by directing the handle of the female branch toward the left thigh, and the handle of the male branch toward the right thigh; this will readily enable you to detach the blades from the head in correspondence with their respective curved and convex surfaces.



FIG. 94.

You may, gentlemen, perhaps imagine that I have been unnecessarily minute in the enumeration of the above rules of guidance; but, if my experience have not deceived me, there is not a direction inculcated which will not be of value to you, when thrown upon your own resources, in the use of the forceps. Study these rules faithfully, become familiar with them, and what is most essential—do not fail to appreciate why they are necessary to a successful forceps delivery. Brevity is always commendable, but it should not be at the cost of an important fact.

I shall now proceed to demonstrate the mode of applying the instrument in the various positions assumed by the head at the inferior strait; in doing so, I shall be enabled to reduce to their practical operation the different rules just cited.

First Position—The Occiput regarding the Pubes, the Face in the Concavity of the Sacrum.—In this position of the head, the forceps is applied with more facility than in any other which it may assume; and, indeed, it is the most frequent position at the inferior strait in which artificial delivery is indicated. Let us now inquire under what special circumstances the instrument becomes necessary in this first position of the head at the outlet. Here, the labor may have progressed most auspiciously; the uterus has contracted regularly and with due efficiency, which has resulted in bringing the head completely down into the pelvic cavity; but at this period of the parturition a *contre-temps* may arise, such as convulsions, hemorrhage, exhaustion; or it may be that there is a slight narrowing of the transverse or bis-ischiatic diameter; or the coccyx, from rigidity of the sacro-coccygeal articulation, will not yield; or, again, there may supervene complete and rebellious inertia of the uterus; or, peradventure, rupture of the organ may take place. Any of these occurrences, therefore, would indicate the necessity of interference; and the proper time for the interference must rest with the urgency of the symptoms, and the sound judgment of the accoucheur.

The consent of the patient, we assume, is had, her position on the bed arranged, the mouth of the uterus, as also the vagina and vulva are adequately relaxed and dilated, the bladder and rectum in the right condition, and the accoucheur with his two aids properly seated. The blades of the forceps have been immersed in warm water, and well lubricated with oil, or lard. In this position of the head, the fingers of the right hand are carefully passed into the vagina, and insinuated with caution between the sides of the child's head and the internal surface of the mouth of the uterus, should the head not have completely escaped from the organ; the male branch of the forceps is seized, as indicated (Fig. 89), and placed nearly parallel to the axis of the woman's body, on the right side; the extremity of the blade is then brought down so as to

press against the palm of the hand already introduced, into the vagina, and the blade is then conducted, during the absence of contraction, along the fingers to be adapted to the lateral surface of the child's head, the handle of the instrument being made gradually to approach the median line; when the introduction of the blade is completed, the handle becomes parallel to the axis of the inferior strait.

But how are you to be assured that the blade has properly grasped the head, and that the extremity of the fenestrum is near the inferior maxillary bone? This may be ascertained from the fact that the blade has been introduced to the extent of four or five inches, that it is more or less firm, and in making gentle traction on the instrument in a straight line from within outward, there is a slight resistance. One branch, therefore, being adjusted, it is intrusted to an assistant, who holds it steadily in position (Fig. 90); the accoucheur then withdraws his right hand from the vagina, and proceeds to introduce the other, or female branch, as follows: the fingers of the left hand are carried into the vagina, to be insinuated between the fetal head and *os uteri*; the female blade is next to be seized by the right hand, precisely as was the male blade (Fig. 90); and its introduction to be conducted upon the same principles, remembering that, in this case, the branch must strike nearly a parallel with the long axis of the patient's body on the left side, and is to be introduced *over* and not *under* the blade, which has been already adjusted. As soon as the introduction has been accomplished as far as the lock of the instrument, the hand is to be withdrawn, and the accoucheur then takes hold of both handles of the forceps for the purpose of locking it. Here, there will occasionally be experienced some difficulty, and this may arise from the fact that the first blade introduced has become deranged through inattention of the assistant, or it may be that the second has not been properly adjusted. In either case, the true difficulty, whatever it may be, must be removed before the instrument can be made to lock.

We will now suppose that all is correct: the accoucheur then places his right hand, the dorsal surface upward, on the handle of the forceps, the middle and ring fingers of the other hand (Fig. 92) being insinuated within the two rings; as soon as the pain commences, he begins his traction, which is to consist of a *two third lateral and one third extractive force*; this compound force it is most essential to remember, for it will add greatly to the facility of the delivery. As soon as the contraction ceases, so must the effort of the accoucheur be suspended, *except in cases in which, from imminent danger either to the mother or child, immediate delivery is indicated*. In these exceptional instances, therefore, it is well to recollect that the great object is the prompt termination of the labor.

Those of you, who have never witnessed a case of forceps application, will be amazed to learn the amount of force sometimes required to achieve the delivery; the strongest arms will occasionally be found almost surrendering to the needed effort; and yet all this force, if it only be tempered with judgment, is not only justifiable, but will be quite consistent with the safety of mother and child.

When the head begins to distend the perineum, this latter must be adequately supported, and this may be done by an assistant, or by the accoucheur himself, employing for this purpose the left hand, while he continues his tractions with the right. In proportion as the head advances, the handles of the instrument should be successively elevated, with the view of bringing the chin of the child from the sternum, or, in other words, producing the movement of extension (Figs. 93, 94). When the head has escaped through the vulva, the instrument is to be removed; the accoucheur should place his finger around the neck of the child to ascertain whether or not it be encircled by the umbilical cord; if so, and the cord be drawn tightly, so as to endanger the freedom of the placento-fœtal circulation, one of two things should be done: either to bring a loop of the cord over the head, and thus liberate it from the pressure; or, if this cannot be accomplished, lose no time in making a section of the encircled cord, and then, if the uterus do not immediately expel the child, the hand should be introduced for the purpose of bringing down the arms, and thus expedite the delivery.

Second Position—The Occiput regarding the Concavity of the Sacrum, the Face to the Pubes.—It will at once be seen that the head here is completely reversed; and, moreover, in this position the forceps will, in the majority of instances, be indicated for the reason of the protraction of the labor; for you are not to forget that the occiput, being posterior, must have traversed the entire length of the posterior wall of the pelvic cavity—consisting of the sacrum and coccyx—before it can make its exit; and, as a general rule, the increased duration of the labor will have so far perilled both mother and child as to render it necessary to resort to the forceps. But, in addition, any of the accidents already mentioned would constitute another motive for the use of the instrument. The rules for the introduction of the forceps are precisely the same as in the first position. It is well, however, to remember that there will be more difficulty in the extraction of the head in this second position, and the force employed should be more guarded, for the face cannot be brought under the pubes with the same facility that the occiput was in the preceding case, because of the greater irregularity of its surface; again, the distension of the perineum will be much greater, because of the rounded and more prominent configuration of the occiput. It must also be recollected that, in

this position, the forceps, as soon as the head begins slightly to protrude, instead of being elevated, must be depressed, for the purpose of bringing the chin from the sternum, so that when the head is delivered the instrument will be at a right angle with the spinal column.

Third Position—The Head presenting Diagonally, the Occiput regarding the Left Lateral Portion of the Pelvis, the Face at the Opposite Sacro-iliac Symphysis.—When describing the mechanism of natural labor, you were told that the head undergoes three movements—flexion, rotation, and extension—before its exit through the maternal organs can be effected; but it will sometimes happen that nature is so far contravened in the completion of this mechanism, that she will need the assistance of art for its accomplishment. Here then, we will suppose that flexion has taken place, and the head descended into the pelvic cavity in its diagonal position; the uterus contracts with great effort, and continues to do so, but there is no change in the direction of the head; it still occupies the diagonal position; the strength of the mother, from the continued but ineffectual efforts of the uterus, begins to give way; the brain of the child, also, is in danger from severe pressure, as is evinced by the extreme heat and dryness of the vagina, and the corrugations of the scalp.

What, under these circumstances, is to be done? If the accoucheur content himself with assuring the patient that the labor is progressing favorably, that it will soon be terminated, and all that is necessary is to “*bear down*” and “*make the most of her pains*,” he will not only be delinquent in duty, but will find, when too late to remedy the evil, that he has, either through wanton carelessness or gross ignorance, allowed one, and perhaps two lives to be sacrificed. Instead, therefore, of such passive and unpardonable conduct, he should at once proceed to ascertain the true cause of the delay in the delivery. Let him inform himself why it is that the head is not responsive to the powerful contractions of the uterus; why, in a word, with such efforts on the part of the organ the labor is not ended. As soon as he discovers that nature has been struggling in vain to effect the movement of rotation, and recollecting that the head, so long as it occupies the diagonal position in the pelvic cavity, cannot make its exit, he will appreciate the certain danger of further delay, and will come promptly to the aid of the suffering patient by doing for her what nature has been unable to accomplish, viz. the rotation of the head.

This, then, is a case for the interposition of the forceps;* but how is it to be introduced, the head occupying the diagonal position

* Sometimes, the accoucheur will be able to rotate the head by the simple introduction of the hand; and, when this is done, if there be no urgent necessity, the subsequent part of the labor may be left to the natural resources.

in the pelvic cavity? Assuredly not by placing the blades on the sides of the pelvis, for it is manifest that, in doing so, the lateral surfaces of the head could not be grasped; nor could the object for their introduction—rotation—be accomplished. Here, the female branch is to be introduced first, and for this purpose let it be held, as already described, by the right hand; and with the fingers of the other hand carried into the vagina as a guide, the extremity of the blade should be introduced toward the right foramen ovale, to the distance of about four inches, the handle of the instrument, in proportion as the blade passes along the parietal region of the head, being depressed and inclined toward the left thigh of the patient in order that it may become parallel to the oblique or diagonal position of the child's head. The female branch thus introduced is to be confided to an assistant; the male branch is then insinuated with the left hand along the fingers toward the left ischiatic notch, for the purpose of being adapted to the other parietal region of the head, care being taken to cause the handle to approximate that of the branch already introduced. The instrument is then locked; the hands grasping the forceps, as in the first and second position, the first thing to do is to make a movement of the instrument from left to right, the object being to rotate the head, which being accomplished, it is no longer in the diagonal position, but is so placed, that the occiput is in correspondence with the symphysis pubis, while the face is in the concavity of the sacrum. The termination of the delivery is then to be conducted precisely as in the first position.

Fourth Position—The Head presenting Diagonally, the Occiput regarding the Right Lateral Portion of the Pelvis, the Face at the Opposite Sacro-iliac Symphysis.—In this position, the head is also oblique in the pelvis, and in order that it may have its transit insured, it must, as in the preceding case, undergo the movement of rotation. For this purpose the male branch of the forceps, seized with the left hand, is introduced first along the fingers of the other hand in the following manner: Carried into the vagina under the left foramen ovale, it is gradually depressed toward the right thigh of the patient until it becomes parallel to the diagonal direction of the head. The female branch is introduced toward the right ischiatic notch, and the handle made to approximate that of the male branch. The instrument is then locked; here, the movement must be from right to left, so that the occiput may be brought to the symphysis pubis, and the face in the concavity of the sacrum. The delivery is then terminated as usual.

It is well to remember that when the head occupies at the inferior strait a diagonal position, it is not always situated as has just been described; for the occiput, in lieu of being at one of the anterior and lateral portions of the pelvis, may be turned toward one of the

posterior and lateral surfaces of the canal, while the face or forehead will present at one of the corresponding opposite anterior points. For example, in what are termed the posterior occipital positions, the occiput regards one of the sacro-iliac junctions, while the forehead will look toward the opposite anterior lateral surface of the pelvis. Now, the fact which I wish to impress upon you is this—no matter whether the occiput be anterior or posterior, the head still occupies a diagonal position, and consequently the obstacle to its passage is precisely the same; therefore, in either case, the application of the forceps and the delivery are to be conducted in accordance with the same rules, with the simple exception that, in the occipito-posterior positions, the occiput, instead of being brought to the symphysis pubis, must be rotated into the concavity of the sacrum.

Application of the Forceps, the Head being at the Superior Strait.—Precisely the same indications may present themselves for the use of the forceps, the head being at the brim or upper strait, as after its descent into the pelvic cavity; for example, hemorrhage, convulsions, inertia, exhaustion. But one of the principal causes, calling for the employment of the instrument in these cases, will be a slight disproportion between the head of the fetus and the brim, whether from contraction of the latter or an increased development of the former.* When this disproportion really exists, and the antero-posterior diameter is not less than three inches and a quarter, the forceps would probably present a safer mode of delivery than version. Yet, I am quite confident that to apply the forceps properly at the upper strait is one of the most difficult operations in obstetric surgery, and the hazard of injury to the soft parts of the mother is very great; for here, you are to remember, besides the difficulty of accurately adjusting the instrument to the head of the child, there is the danger of lacerating the cervix uteri and perineum. Again: the safety of the child is much more likely to be compromised, in consequence of the more protracted tractions necessary to accomplish its delivery.

But you may ask, what is the true difference in the danger of forceps application, when the head is at the inferior or superior strait? A moment's thought will very satisfactorily explain this difference. In the former case, the instrument in order to grasp the head properly is required to pursue but one axis of the canal—the axis of the lower strait—while, on the contrary, the head being at the brim, one of the fundamental principles of success is, that the

* It has already been stated that Prof. Simpson, in revival of an old practice, has suggested the substitution of version for the forceps and craniotomy, when the head is at the superior strait, and there is a contraction of the brim; but of the propriety and oftentimes practicability of such substitution I have my doubts, as has been mentioned in a previous lecture.

forceps shall be introduced in accordance with the two curves of the pelvic cavity, viz. the curve of the inferior and the curve of the superior straits. Therefore, I should advise you, whenever you have the election between the two alternatives, forceps or version— if there be no contraction at the brim—to prefer version, unless the uterus be so firmly contracted around the body of the foetus as to render the introduction of the hand impossible; in this event, it would be better to resort to the forceps.

I have on several occasions been obliged to apply the instrument at the upper strait, and happily with safety to both mother and child, where the alternative of version did not exist. It will only be necessary, however, for you to attempt the operation once, to become persuaded of the difficulty and danger involved in it. The following case is in point:

I requested two of my students, Messrs. Guernsey and Blodgett, to attend one of my clinic patients, who was in labor; she was twenty-four years of age, healthy and robust, and pregnant with her first child. She had been suffering more or less from slight pains for two days before these gentlemen visited her; and after the lapse of twenty-six hours from their first visit, Mr. Guernsey informed me that, notwithstanding strong uterine contractions for the last eight hours, there was no progress in the delivery, and the friends were becoming impatient. He also remarked (I had not yet seen the patient) that she was strong and muscular, with a bounding pulse. I suggested to him to bleed her to the extent of $\frac{1}{2}$ xij, and inform me in the course of two hours, whether any progress had been made. At this time I was sent for, and was accompanied by another pupil, Mr. De Courcey. When I arrived, the gentlemen in charge of the case remarked that the head was still at the upper strait, and that the pains, although severe, had occasioned no progress in the delivery. On making a vaginal examination, I found their representations to be literally true; the mouth of the uterus was dilated, but the head unusually large and resisting had not begun to disengage. The occiput was toward the left acetabulum, the anterior fontanelle at the opposite sacro-iliac symphysis, and the head in a demiflexed position. There was considerable heat about the vagina, and the scalp was evidently corrugated, showing that unusual pressure (all, however, unavailing) had been exerted on the head, and that the child from this cause was in more or less danger. The woman herself earnestly supplicated that we should deliver her, her only anxiety being the safety of her child. It was no easy matter to decide upon the course to be adopted in this case; it was evident, however, that artificial delivery was indicated; but whether by version or the forceps was a question of some delicacy to determine.

Under ordinary circumstances, there would have been no hesita-

tion, for the head being at the superior strait, and interposition being necessary, version would be preferable. But, in this instance, the head was more than ordinarily large, and turning would, of course, have been attended not only with much difficulty to the operator, but with serious results most probably to both mother and child. Add to this, that the uterus was contracting with great energy, and it will be seen that the question naturally arose—which would afford the best chance to the mother and child, the forceps or turning? I decided on the former, and in consequence of the peculiar circumstances of the case, departed, in this preference, from the rule which I hold to be very generally proper—to *turn rather than attempt delivery by the forceps when the head is at the upper strait*. Proceeding cautiously, after some little difficulty I succeeded in adjusting the blades of the instrument, but found it utterly impossible to approximate the handles of the forceps, in consequence of the size of the head. I carefully held the handles, guarding against the possibility of the blades slipping, and commenced my tractions downward and backward, and succeeded in about twenty minutes in delivering the patient of a vigorous and unusually large living child.

The application of the forceps, the head being at the superior strait, is a modern expedient; and the credit of having been the first to resort to this measure is generally, I believe, awarded to Palfyn, who, in 1723, actually applied the instrument and delivered the fœtus. Before this time, the long forceps was not in use, and it was with the view of imitating the example of Palfyn that Smellie improved his forceps by adding to its length, and giving to it the curve on its border, thus causing it to correspond with the two curves of the pelvis.

Application of the Forceps at the Superior Strait, the Occiput regarding the Pubes, the Forehead the Sacro-vertebral Prominence.—When describing the position of the fœtal head, and the mechanism of its descent into the pelvic cavity, you were told that it is extremely rare for the occiput to remain, after the contractions of the uterus have fairly commenced, either at the pubes or sacrum, its tendency being to turn either to the right or left, thus converting the direct into one of the oblique or diagonal positions. Yet, as an exception, these direct positions may continue, and therefore, it is proper that the rules for the application of the forceps, under these circumstances, should be indicated. Here, the male branch is introduced first; the right hand, with the exception of the thumb, is carried along the vagina, and the ends of the fingers cautiously insinuated within the cervix of the uterus; the branch of the instrument is held by the left hand, and introduced on the left side of the pelvis with a view of being adjusted on the lateral surface of the child's head. The branch is carried up to the distance of

seven or eight inches, so that the lock is brought quite near the vulva. In proportion as the blade glides along the side of the head, care should be taken to depress the handle, so that it may be brought parallel to the axis of the upper strait. This branch being arranged, it is to be entrusted to an assistant; and the female branch, held with the right hand, is to be carried up along the left hand previously inserted into the vagina; as soon as the blade begins to pass over the parietal protuberance of the head, the handle should be depressed as in the other instance, in order that the two handles may be approximated and locked.

This being accomplished, the forceps is seized, as previously indicated; and now there is a point of moment to be recollected, otherwise the difficulty of extraction will be very much enhanced, and so also will be the danger to the child. The point is this—before employing any extractive force, the first thing to do is, by a gentle rotary movement of the instrument, to bring the occiput in apposition with the left acetabulum, thus converting it into the first position of the vertex; in order to effect this, the outer extremity of the forceps must be well depressed, and directed toward the left thigh of the mother. We will now suppose the rotation to be effected; then the compound force, already alluded to, is to be commenced, and the tractions made in a line parallel to the axis of the superior strait—caution being taken not to injure the perineum by the handles of the instrument—until the head is brought down into the pelvic cavity. Now, you are not to forget that the head, from the time its position was changed at the brim, occupies a diagonal direction. Therefore, as soon as you have caused it to descend into the excavation, all extractive force must cease, until by another rotary movement you place it in the direct position by bringing the occiput to the symphysis pubis, and consequently the face into the concavity of the sacrum. Having done this, the delivery is to be terminated in accordance with the rules already mentioned when speaking of the use of the forceps, the head being at the inferior strait.

Application of the Forceps at the Superior Strait, the Occiput regarding the Sacro-vertebral Prominence, the Forehead the Symphysis Pubis.—One moment's reflection on the relations of the head to the pelvis in this position, will serve to show you that the obstacle to delivery will be much greater than in the former case, for the reason that, here, the face is directed toward the pubes which, as has already been explained, will cause the extraction to be both more difficult and protracted. There has prevailed a difference of opinion among writers as to the management of this position of the head. For example, Smellie advised that the face should be turned toward the concavity of the sacrum, either before or after the head had passed the superior strait. If you follow this

direction—and it comes from very high authority—you will incur the almost certain hazard of destroying the child by the extreme torsion to which you subject its neck, amounting, as you perceive, to one-half of a circle. Again: it has been recommended, in this position, to place the border curve of the forceps in correspondence with the sacrum.

The application of the instrument on the manikin will speedily convince you not only of the inconvenience, but the utter absurdity of this latter precept. Instead, therefore, of adopting either of the above rules, the forceps should be introduced precisely as in the former case, on the sides of the pelvis, and made to grasp the head on its lateral surfaces. After the instrument has been properly adjusted, a gentle rotary movement should be imparted to the forceps for the purpose of turning the forehead toward the left acetabulum; then, with downward and backward tractions, the head being brought into the pelvic cavity, it is again changed from the diagonal to the direct position by bringing the face to the symphysis pubis. The delivery is subsequently terminated as has already been described, the head being at the inferior strait with the face to the pubes, and the occiput in the concavity of the sacrum.

Application of the Forceps at the Superior Strait, the Occiput regarding the Left Acetabulum, the Forehead the opposite Sacro-iliac Symphysis.—It will be perceived that the head occupies in this position a diagonal direction at the upper strait; and the forceps is to be so introduced as to seize the head in its long or occipito-mental diameter. For this purpose, the female branch is introduced first; it is held by the right hand and glided along the fingers of the other, which are carried to the os uteri in the direction of the right sacro-iliac symphysis; the blade of the instrument is introduced toward this latter point until it embraces the forehead; it is then brought over the temple, which will be found in correspondence either with the right foramen ovale or symphysis pubis, depending upon whether the head occupies the diagonal or transverse position. In proportion as the blade becomes adapted to the side of the head, the handle of the instrument must be gradually depressed toward the floor of the pelvis. This branch being thus adjusted, it is to be confided to an aid. The male branch is then held by the left hand, and directed along the fingers of the right, which are introduced into the vagina toward the sacrum; the blade is made to glide along the hand in the direction of the front of the sacrum; at first, the extremity of the handle is to be elevated with an inclination toward the left side of the pubes; in proportion, however, as the blade glides along the sacrum and under the head, the handle is gently depressed for the purpose of approximating it to that of the female branch.

The two respective branches being locked, the instrument is seized by both hands, as previously indicated. The direction of the extractive force must at the commencement be downward and backward, parallel to the axis of the superior strait, remembering to keep the handle of the forceps inclined toward the left thigh of the mother, in order to bring the head into the pelvic cavity; when the head has thus descended, do not forget that it still occupies the diagonal position. Therefore, all traction must cease until the occiput is rotated to the symphysis pubis; the delivery is then completed as has been described.

Application of the Forceps at the Superior Strait, the Occiput regarding the Right Acetabulum, the Forehead the opposite Sacro-iliac Symphysis.—Here, again, the relations of the head to the upper strait of the pelvis are the same as in the former position, and precisely the same principles are to be observed in the application of the instrument. The male branch is introduced first; it is held by the left hand, and passed along the fingers of the other hand, which are carried toward the left sacro-iliac symphysis; as soon as the blade embraces the forehead, it is then to be cautiously directed toward the temple, which will be found to correspond with the left foramen ovale, or symphysis pubis. The handle, in proportion as the instrument becomes adjusted, is to be depressed toward the floor of the pelvis. The female branch is now held by the right hand, and introduced along the fingers of the other hand. It should be directed under the head, following the anterior surface of the sacrum. The extremity of the handle, which is at first elevated and turned toward the right groin of the mother, must, as the blade advances upon the head, be brought downward or depressed for the purpose of uniting with the male branch. The instrument being locked, the handles are seized by the two hands, and an extractive force exercised downward and backward parallel to the axis of the superior strait; when the head is brought into the pelvic cavity, a rotary movement from right to left must be made, in order to turn the occiput to the symphysis pubis, and the face to the concavity of the sacrum. The delivery is afterward completed in the manner already indicated.

Supposing the head to occupy reverse positions at the brim, viz. the forehead at the left or right acetabulum, and the occiput at the right or left sacro-iliac symphysis, the application of the forceps is to be conducted precisely on the same principles, remembering, however, that the male branch should always be under the symphysis pubis, and the female branch in front of the sacrum.

Application of the Forceps in Locked-Head.—The term *locked-head* is made to mean many different things, according to the definitions given of it by the various writers, who have alluded to the subject. Without occupying time in the enumeration of the con-

flicting opinions as to what locked-head really is, it will be sufficient, for all practical purposes, to state that the very term implies an immobility or fixedness of the head, which no power of the uterus can overcome; and which immobility is in part demonstrated by the fact that the head cannot be made either to ascend or descend by any manual effort of the accoucheur. And here, I may be permitted to say, that I do not believe this condition of things to be possible in a well-conformed pelvis, the head possessing its ordinary dimensions.

Locked-head, therefore, when it does occur, is, in my judgment, the result of a disproportion between the head of the fœtus and pelvic canal, whether from excessive size of the former, or diminished capacity of the latter. This, too, is the opinion of Madame La Chapelle,* who, in her vast experience in the *maternité* of Paris, never met with an example of locked-head where there was a proper relation between the fœtus and maternal organs; moreover, this clever observer is inclined to believe that what has been supposed by most writers to be veritably locked-head, may be explained in another way, and referred to deformities of the pelvis, malpositions of the fœtal head, or to strong and long-continued efforts of the uterus. It is quite evident to my mind, and amply proved by personal experience, that there is oftentimes an erroneous diagnosis arrived at on this question in the lying-in room. I have more than once been summoned by my professional friends to meet them in counsel in cases of supposed immobility of the head; and, on a close examination of the state of things, I have found, not that the head was immovable, but simply that its progress through the pelvic canal was sluggish, requiring only that very essential, but too frequently neglected remedy—*patience*.

There exists, also, a very remarkable discrepancy of opinion among writers as to the relative frequency of locked-head compared with other formidable obstacles calling for the interposition of science. For example, while it is conceded that it is of rare occurrence in France, our own distinguished countryman, Dr. Dewees,† avows that he has never recognised an example of it in his practice, which circumstance he refers to the fact of the generally prevailing healthy or normal pelvic conformation of our American women; yet we have a high authority, Camper,‡ assuring us that, in Holland, locked-head is by no means among the rare occurrences of the parturient chamber. This discrepancy, it seems to me, arises from the circumstance of the general want of concurrence as to the true meaning of the term locked-head; for I can see nothing in the women of Holland so marvellously different from those either of France or America, which could rationally account for the very

* *Pratique des Accouchements*, p. 120.

† *System of Midwifery*.

‡ *Acad. de Chirurg.*, tome v. p. 450.

extraordinary alleged difference in the relative frequency of the complication under discussion. Therefore, I repeat, locked-head is one thing in Holland, another in France and our own country. This leads me to remark that statistics on any given subject, in order that they may possess their true value as reliable data, should have a common basis.

Let us now examine in what the real dangers of this complication consist, so far as regards the welfare of both child and parent, assuming the true practical definition of the term locked-head to be—an *immobility in resistance to the most powerful contractions of the uterus, or the best directed manual efforts of the accoucheur*. It is manifest that these dangers, if there be any, should be thoroughly and opportunely comprehended, for on the early recognition of this positive immobility of the head must depend the issue of weal or woe to mother and child.

1. *Dangers to the Child*.—When there is complete immobility of the head, notwithstanding the vigorous contractions of the uterus, it is too plain to need comment that the life of the child is exposed to the most imminent peril from one or other of the following circumstances: undue compression of the brain; depression and fracture of the cranial bones; the formation of excessive epicranial sanguineous effusions, or even the detachment of the scalp itself, which may ensue from powerful and protracted pressure of the contracting uterus.

2. *Dangers to the Mother*.—The continued resistance of the head to the impulsive efforts of the womb, may result disastrously to the mother in several ways: for example, there may ensue convulsions or rupture of the organ in some portion of its area; undue pressure on the bladder, urethra, rectum, or vagina, giving rise to vesico-vaginal, urethro-vaginal, or recto-vaginal fistulæ, abscesses or sloughs; and, also, the excessive compression of the sacral plexus of nerves may terminate in paraplegia, and other formidable derangements of the nervous system. If to these accidents be added the possibility of sudden congestions, not at all unlikely to occur under the circumstances, of the brain, lungs, etc., we shall have, I think, a picture of contingencies well calculated to awaken the attention and excite the vigilance of the conscientious accoucheur.

Under what circumstances may locked-head occur? I have already stated that I do not think it possible, except in cases in which there is a disproportion between the fœtus and pelvis; and conjoined with this must be the prerequisite facts: 1. That the disproportion is not such as to prevent the head from a partial descent, so that it may become absolutely locked; 2. There must be contractions of the uterus adequate to cause this partial descent. If what I have just said be true, and I refer you for the demon-

stration to the bedside, it manifestly follows that, although disproportion may exist, yet, without sufficient contractile force, locked-head cannot ensue; for it is, as you will not fail to recollect, the continued impelling action of the uterus, which *wedges*—I know no better term—the head of the fœtus into the contracted space. Therefore, the real causes of this complication may be divided into the predisposing and exciting; the former refers to the disproportion between the pelvic canal and fœtus; while the latter, the exciting cause, will be the effort of the uterus.

Diagnosis of Locked-head.—The head may become locked either at the superior strait, or in the excavation. In either event, it will be in one of two positions, viz. it will present directly or transversely. In the former case, the occiput will regard the pubes, and the face the sacrum, or *vice versâ*; in the latter, the head being in the transverse direction, one of the ossa parietalia will be in front, the other behind. Before describing the means of remedying this difficulty, and thus protecting the mother and child against the dangers of the complication, it may not be unprofitable to inquire, for the moment, in what the true diagnosis of locked-head consists, and whether it may not be likely to mistake something else for it. The solution of this inquiry is essentially material, under the circumstances, to the proper duty of the accoucheur; and here, allow me to impress upon you the necessity of a just distinction between what is and what is not.

I am quite sure that want of proper judgment has oftentimes induced the inexperienced practitioner to imagine that he had a case of impacted or locked-head, when, in fact, this state of things had no sort of existence; the error has arisen in this way: he has recognised, by a digital examination, a more or less hard tumefaction of the scalp, a thick and swollen condition of the neck of the uterus, together with unusual engorgement of the vagina and vulva, and these phenomena, too, accompanied by strong uterine contractions; now, the question is, do these symptoms positively indicate locked-head? By no means; for the testimony, in order to be complete and of value, needs one more circumstance, which constitutes the essential and only positive proof of the head being locked, viz. *its immobility notwithstanding the vigorous efforts of the uterus*.* Therefore, before determining that this complication exists, it must be first ascertained that the head is not apparently, but really fixed, or, in other words, immovable.

A just diagnosis on this essential point, will be the means of preventing interference oftentimes not called for. There are few accoucheurs of extensive practice, who will not concur in the opinion that nature is frequently enabled to accomplish delivery by

* It may be mentioned in this connexion that recession of the head between the pains is decisive evidence that impaction does not exist.

her own resources in cases in which all the symptoms above described, except the immobility of the head, are present; and hence you will occasionally see, in the course of your observation, examples of an extremely elongated head, the result of the extraordinary pressure it has undergone, and yet the child born alive. This goes to show the conservative care of nature, and how adequate she is, oftentimes under the most unfavorable circumstances, to perform her duty—if not officiously intruded upon—consistently with the safety of both mother and child.*

But we will assume that all doubt as to the existence of locked-head is at an end, and the diagnosis complete; what, then, is to be done? The object to be accomplished is, unquestionably, to deliver the child as speedily as possible, for every moment which elapses from the time the head has become immovable is so much against both mother and child. The mode, however, to be adopted in the delivery will depend upon whether the child be alive or dead; and this, under the circumstances, I hold to be an important distinction. If the child be still living, recourse should be had to the forceps. On the contrary, if it be dead, I should recommend the perforator and cephalotribe as the most available means of terminating the birth.

Application of the Forceps in Locked-Head, in the Direct Position, the Occiput at the Pubes, the Face toward the Sacrum.—Before introducing the instrument, the true condition of the head must be fully comprehended; here, for example, resting as it does with the occipito-frontal diameter in accordance with the direct or antero-posterior of the pelvis, it is evident that the lateral surfaces of the head correspond with the sides of this canal; consequently, the rule is to introduce the blades of the forceps, one on the left and the other on the right side, in order that the head may be properly grasped laterally in the direction of its occipito-mental diameter. The manner of introducing the instrument is the same as has previously been described in this position of the head when it is not locked or immovable. The blades, we will suppose, are properly applied, and the handles in juxtaposition. What is next to be done? A moment's thought will remind you that the forceps has grasped a head, which is completely immovable in the pelvic canal. Therefore, the brain of the accoucheur must be slightly exer-

* In these cases, however, of more than ordinary difficulty, it becomes the accoucheur to exercise a constant and judicious vigilance; otherwise, serious consequences may ensue. If, for example, he should recognise a giving way of the mother's strength, or any other circumstance likely to compromise her; or should he find that the pressure to which the head is subjected, is such as to place the life of the child in peril, then, of course, it will be his duty to interpose, and terminate the delivery. However, what I desire to inculcate is this: *as long as the head is known to respond in its progress to the contractions of the uterus, all other things being equal, the labor should be committed to nature.*

cised in order that he may determine upon the course to be pursued.

What he is to do is this—the forceps being adjusted on the head, the accoucheur should seize the handles, and endeavor to change the position to a diagonal one by bringing the occiput toward the left acetabulum; but much dexterity will be needed. If he attempt by mere force to push the head upward, he may inflict immeasurable injury; or to endeavor by powerful tractions to cause the head to descend into the pelvis, before it has undergone the required change of position, would be equally dangerous and nugatory. He should, on the contrary, attempt in the first place, if I may so term it, to unlock or loosen the head by a cautious and continued lateral movement from right to left. This once accomplished, the occiput is to be placed in apposition with the left acetabulum, and the extraction terminated as already indicated. If the forehead be at the pubes, and the occiput toward the sacrum, the same rules obtain both for the introduction of the instrument, and the delivery of the child; except that, instead of the occiput, the forehead should, in converting the direct position into a diagonal one, be brought to the left acetabulum.*

In the event of the head being locked when resting either in the diagonal or transverse position, the rules for the introduction of the instrument are the same as when the head occupies either of these positions, and is not locked. These rules have already been given; yet it is well to remember that, in both instances, the forceps should be so introduced as to seize the head on its lateral surfaces, and not place one blade on the occiput, and the other on the face, as is recommended by some authors, when the head occupies a transverse position.

* It may happen that, either in an occipito-pubic or occipito-sacral position, it will be easier to turn the occiput or forehead to the right instead of the left acetabulum. In such case it should be done without hesitation.

LECTURE XL.

Forceps Delivery continued—Use of the Instrument when the Head is retained after the Expulsion of the Body—Circumstances justifying the Forceps in these Cases—Application of the Instrument, the Head at the Inferior Strait, with the Occiput at the Symphysis Pubis, the Face in the Concavity of the Sacrum—Application in a reverse Position—When the Occiput is at the Left and Front of the Pelvis—The Occiput at the Right and Front of the Pelvis—Use of the Instrument, the Head resting at the Superior Strait—The Forceps in Face Presentations—Under what Circumstances indicated—Practice of the Old Schoolmen in Face Presentations—Objections to—When Version is to be Preferred to Forceps Delivery in Face Presentations—The Manner in which the Face usually presents at the Superior Strait—Right Mento-iliac Position—Left Mento-iliac Position—Mode of Descent in these Positions—Manner and Difficulty of applying the Forceps in Face Presentations at the Superior Strait—Use of the Instrument when the Face is at the Inferior Strait—Mento-anterior Position—Mento-posterior Position—Comparative Rarity of the latter Position—The Oblique Positions of the Face at the Inferior Strait—How managed—Face Presentation and Convulsions—Case in Illustration.

GENTLEMEN—We have now to speak of the use of the forceps after the body of the child has made its exit through the maternal organs. Although, when discussing the natural presentations of the fœtus in utero, I told you the presentation of either of the obstetric extremities of the ovoid is in perfect keeping with the resources of nature, yet, at the same time, you were admonished that the child encounters more hazard when either of the pelvic extremities is found at the superior strait, than in an ordinary vertex presentation; and for the double reason that, in the first place, the umbilical cord is much more liable, especially in footling cases, to undue and dangerous pressure; and, secondly, there is the possibility of more or less difficulty in delivering the head after the body has made its escape. The mode of overcoming this difficulty by simple manipulation has been fully explained in a previous lecture. It may, however, sometimes be found impracticable to bring the head into the world by any manual effort, and, under these circumstances, it will become necessary to resort to the forceps.

I am inclined to believe that a dexterous accoucheur, one who not only knows what to do, but how the object is to be accomplished, will almost always succeed in delivering the head by a manual operation, unless the obstacle be in consequence of more or less disproportion between the head and pelvis, the latter being

slightly contracted, or the former slightly enlarged. In these latter instances, it is, I think, that the use of the forceps will be more frequently indicated after the trunk has been expelled. With, perhaps, more than my share of pelvic presentations, either in my own immediate practice or through consultation, I have met with but two cases in which I could not overcome difficulty in the delivery of the head by simple manipulation. In the two cases alluded to, the arrest in the expulsion of the head was occasioned, in one instance, by a contraction of about one quarter of an inch in the antero-posterior diameter of the upper strait; in the other, the head was unusually large. In both cases I was obliged to have recourse to the forceps, and was fortunate in delivering the children alive.

Some appalling results occasionally ensue from the rude and unskilful attempts to extract the head by manipulation. Such, for example, as the detraction of the fetus, rupture of the uterus, breaking the neck of the child, or, what is just as fearful, dislocation; serious lacerations of the soft parts of the mother, involving the vagina, rectum, or bladder. Many a tale of woe could be told, if the truth were spoken, in reference to this point. There is no necessity for these sad consequences once in ten thousand times; and they accumulate merely because brute force is too often substituted for judgment and skill. These melancholy occurrences in the lying-in chamber attract, unhappily, no special attention; surrounding friends are satisfied because they have had rung into their ears, and they have faith enough to believe it, that stereotyped phrase—"All was done that could be done!" How fortunate for some men that they practise among a credulous public, and that their acts are subjected to no truth-revealing scrutiny! But is there a corresponding benefit to the public?—is that public in any way requited for its measure of faith? I think not.

Indications for Forceps Delivery after the Expulsion of the Trunk.—It may become necessary to resort to the forceps for the purpose of delivering the head after the passage of the trunk through the maternal organs, under the following circumstances: 1. In version, the entire operation being completed, except the extraction of the head, this latter being arrested in consequence of some disproportion, etc.; 2. In an original pelvic presentation, in which the natural effort has been adequate to expel the trunk, but not the head; 3. The occurrence of convulsions, exhaustion, or any other serious complication, after the exit of the trunk has been completed. When, in any event, it becomes urgent to apply the instrument, the head may be arrested either at the superior or inferior strait, in the direct, diagonal, or transverse positions. We shall first describe the manner of using the forceps, the head having reached the inferior strait:

Application of the Forceps after the Escape of the Trunk; the Occiput regarding the Symphysis Pubis, the Face toward the Sacrum.—If the head should have descended to the inferior strait, the first thing to do, as preliminary to the introduction of the instrument, is gently to elevate the trunk and arms of the fœtus toward the abdomen of the mother (Fig. 95). Thus elevated, they are to

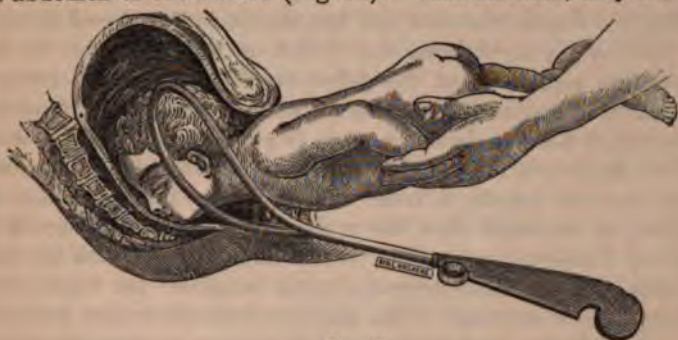


FIG. 95.

be maintained in this position by an assistant, while the application of the forceps is to be conducted as follows: The male branch, held by the left hand, is glided along the fingers of the other hand on the side of the pelvis and head, precisely as has been indicated in the corresponding position of the vertex, with the occiput toward the pubes and the face in the concavity of the sacrum. This branch adjusted, it is entrusted to an aid, and the female branch is then seized by the right hand, and carried on the other side of the pelvis. The instrument is locked, and the extractive and lateral forces conducted upon the same principles as previously described; the extremity of the handle of the forceps should be gradually raised toward the pubes until the forehead has passed the vulva, and care should be taken to give proper support to the perineum, in order that laceration may be prevented.

Application of the Forceps after the Escape of the Trunk, the Occiput at the Sacrum, the Face toward the Pubes.—Here the trunk and arms of the fœtus, instead of being elevated, should be directed backward in the direction of the perineum, and being held by an assistant, the accoucheur proceeds to introduce the forceps on the sides of the pelvis and head in the same manner as if it were a vertex presentation, with the occiput toward the sacrum, and the face at the pubes; the extractive and lateral forces, together with the delivery, are also to be governed by the same rules as in this latter position of the head.

Application of the Forceps after the Escape of the Trunk, the Occiput toward the left and front of the Pelvis, the Face at the opposite Sacro-iliac Symphysis.—Here, you perceive, the head rests in a diagonal position, and the body of the child should be

placed in a corresponding direction. The trunk and arms, therefore, should be turned toward the left thigh of the mother, and confided to an assistant. The instrument is then to be introduced as if the vertex presented with the occiput to the lateral portion of the pelvis, and the face regarding the opposite point of the pelvic canal. The occiput in this case being to the left and front of the pelvis, the female branch of the instrument is introduced first; it is held by the right hand, and glided on the fingers of the left along the right side of the pelvis until it reaches the chin; it should be continued in the same direction as high as the forehead, from which point it should be made to pass, by the gentle pressure of the fingers, within the pelvis, under the middle of the face and upon the left temple, in order that it may be brought under the pubes; at the same time the extremity of the handle should be slightly depressed, and turned toward the left thigh, with the view of adjusting the blade properly to the length of the head. This branch is now entrusted to the aid; the accoucheur then holds the male branch with his left hand, and introduces it along the fingers of the other hand in front of the sacrum, in order to grasp the other side of the head. The forceps is then locked, and before resorting to any extractive force, a rotary movement from left to right should be imparted to the instrument, for the purpose of placing the occiput at the pubes, and the face in the concavity of the sacrum. The combination of the lateral and extractive forces is next to be employed, and the delivery completed as if it were an original vertex presentation with the occiput toward the symphysis pubis.

Application of the Forceps after the Escape of the Trunk, the Occiput to the right and front of the Pelvis, the Face at the opposite Sacro-iliac Symphysis.—Here, again, the position of the head is diagonal in the pelvis, and the same rules are to be observed in the introduction of the forceps as in the preceding example, except that the male branch is to be introduced first, because the occiput, instead of being to the left, is to the right. It is to be brought under the pubes, while the female branch should be directed along the front of the sacrum, in order that the new curve of the instrument may correspond with the occiput, or anterior portion of the pelvis. The two branches being locked, rotation from right to left is first accomplished for the purpose of changing the direction of the head from the diagonal or oblique to the direct position, by placing the occiput in correspondence with the symphysis pubis, and the face toward the sacrum. The delivery is then completed in accordance with the principles already indicated.*

* If, after the escape of the trunk, it be found that the head occupies a diagonal position, the reverse of those we have just described, viz. the occiput at either of the sacro-iliac symphyses, and the face to the lateral anterior surfaces of the pelvis,

Application of the Forceps, the Head at the Superior Strait.—Having pointed out the rules to be adopted in the use of the forceps, the head being at the inferior strait after the exit of the trunk, it remains for us to make one or two observations in reference to the application of the instrument when the head, from whatever cause, becomes arrested at the brim. You have been reminded that, in a vertex presentation, and the body of the child yet within the uterus, the adjustment of the forceps, the head being at the upper strait, is one of the most difficult operations in obstetric surgery; for this reason you will remember, when artificial delivery is indicated, and you have the alternative of choice, I recommend version in preference to instrumental delivery. But, however embarrassing and perilous the application of the forceps in an ordinary vertex presentation at the superior strait, the difficulties and dangers are enhanced after the trunk has made its escape and the head remains at the brim; for here, you will perceive, is the increased difficulty of conducting the forceps to the strait, in consequence of the vagina being more or less obstructed by the upper portion of the child's body, and this, too, in proportion to the elevation of the head in the pelvis. If, however, you should have a case in which forceps delivery is indicated, the head remaining at the superior strait after the escape of the trunk, the same rules are to govern in the use of the instrument as if it were originally a vertex presentation, and the head arrested at the brim, the only important difference being that proper provision is to be made for supporting the body of the child, as was pointed out when speaking of the application of the instrument, the head being either in the excavation or at the inferior strait.

Application of the Forceps in Face Presentation.—When treating of face presentations,* you were told that, all things being equal, they are entitled to be regarded as natural, and, therefore, within the resources of nature. But here, as in the case of an ordinary vertex presentation, something untoward may occur rendering it essential that artificial delivery should be resorted to. It is proper, therefore, that the rules for the use of the forceps in these cases should be indicated. It may, however, be premised that, in face presentations, if the face be at the superior strait, version should be preferred to instrumental delivery for the same reasons that this preference should obtain, under similar circumstances, when the vertex presents and artificial aid becomes necessary. It

the accoucheur should attempt, if possible, to turn the face toward the sacrum. In this, however, he would most likely be foiled; the alternative, under these circumstances, would be to apply the forceps, remembering that the new curve of the instrument must correspond with the face. After the instrument is adjusted, the face is brought to the pubes, and the labor terminated as if it were an original vertex position, with the face in front and the occiput behind.

* See Lecture xxiv.

was the general practice among accoucheurs, before the mechanism of a face presentation was understood, to have recourse to various expedients for the purpose of overcoming what they supposed to be an insurmountable difficulty, when the visage came first. For example, one would recommend to push the face upward and reduce the presentation to that of the vertex; another, to grasp the occiput with the fingers or lever, and draw it toward the centre of the pelvis.

Independently of the undeniable fact that these mutations of the head are not only extremely difficult to accomplish, and the attempt to effect them oftentimes accompanied by more or less danger to the child and mother, it is now well demonstrated that they are altogether unnecessary for the reason that nature, when the proper proportion exists between the head and maternal organs, is competent to cause by her own efforts the descent and expulsion of the child. Again: it was the custom of some practitioners, as soon as it was ascertained that the face presented, to resort at once either to version or the forceps. These abstract modes of procedure had no justification, and were all founded on the supposition that a face presentation was abnormal, and, therefore, beyond the ability of nature to remedy. But experience has proved the contrary of all this, and, in our day, when either version or the instrument is employed, it is not because the face presents, but because of some contingency or complication, which renders the interposition of science absolutely necessary.

You have been told that, as a general rule, the face is found at the superior strait in one of two positions, although occasionally there will be variations; the positions to which I allude, are: 1. The forehead of the fœtus is toward the left iliac bone, while the chin regards the opposite side. This is recognised as the *right mento-iliac position*; and here the *fronto-mental* diameter of the face is in apposition or correspondence with the transverse or bi-iliac diameter of the brim, while, on the contrary, the transverse diameter of the face is parallel to the sacro-pubic diameter of the pelvis. 2. The forehead is toward the right iliac bone, and the chin to the opposite point. This, it will be perceived, is the reverse of the first position, and is known as the *left mento-iliac*. In either of these positions, the head, in its descent, undergoes two movements—diagonal and direct. Thus, as the labor advances in the first position, it changes from the transverse to the oblique direction, so that the *fronto-mental diameter* of the face accords with the right oblique diameter of the pelvis, the chin being opposite to the right foramen ovale; then the chin, through the direct movement, is brought behind the pubes, and the forehead turned into the hollow of the sacrum. In the second position, the mechanism of descent is precisely the same, except that the rotary movement is from left to right instead of from right to left.

My object in recalling to your recollection the peculiar direction of the face in these two most frequent presentations at the superior strait, is to show you the almost impossibility of applying the forceps, until the head has begun to assume, in the course of its descent, the oblique or diagonal position; for, until this is done, the face occupies the strait transversely, either exhibiting the *right mento-iliac* or *left mento-iliac* position. Therefore, if, before the change from the transverse to the oblique direction, there should be imminent urgency for artificial delivery, I advise you by all means to abandon any attempt with the forceps, and proceed to terminate the labor by version. It may, however, happen that the face will so present at the brim as that the chin shall correspond with the pubes, and this would be more likely, perhaps, to occur if there were a slight contraction or narrowing of the transverse diameter; or, instead of the chin being at the pubes, it may correspond with one or other of the acetabula constituting an example of the diagonal or oblique presentation of the face.

In such an event, although I should again as a general principle prefer version to the instrument, yet it is very evident, with a moment's reflection, that the forceps could be applied with about the same facility as if the vertex were at the superior strait. To illustrate, suppose the chin were toward the pubes. In this case, the face would exhibit a direct position, its *mento-frontal* diameter corresponding with the sacro-pubic diameter of the brim. The forceps, under these circumstances, should be introduced along the sides of the pelvis, and would consequently grasp the head in the proper or lateral direction. If, on the contrary, the chin regard one or other of the acetabula,* the *mento-frontal* diameter would be in apposition with one or other of the oblique diameters of the

* It will sometimes occur, that the chin, in face presentations, will occupy a posterior position, corresponding with one or other of the sacro-iliac symphyses, and, under such circumstances, the natural powers may suffice, during the progress of the head, to bring the chin and anterior surface of the child's body in front, and thus the labor will be terminated without the assistance of the accoucheur. But we will suppose an example, in which this change in the position, from behind forward, cannot be accomplished by the natural effort. In this contingency what is to be done? In the first place, it may be remarked that the mere adjustment of the forceps to the head would not of itself be so difficult; but it is to be remembered that, after the adjustment, the difficult thing to accomplish is to bring the chin to the front of the pelvis, a fundamental requisite in all cases of face presentation in order that the head may make its exit; and this will be found, I may safely say, impossible to do, unless the pelvis be unusually capacious or the head under size. Therefore, if nature prove incompetent to direct the chin toward the anterior half of the pelvis, and this should be ascertained opportunely, the resort should be version. If, however, from rigidity or other opposing conditions of the uterus, the hand cannot be introduced, and these antagonizing influences do not yield to the appropriate remedies already pointed out, then there is no alternative but craniotomy if the child be dead; if alive, the question may arise, craniotomy or the Cæsarean section—which topics will be fully discussed in a future lecture.

upper strait. In such an aspect of things, the forceps could also be applied, the same rules precisely being observed as if it were a vertex presentation with the occiput to the pubes, or to the left or right.

So much for the management of face presentations, through the aid of instrumental delivery, the head being at the superior strait. Let us now examine the *modus in quo* of procedure after the head has passed into the pelvic excavation. Under these latter circumstances, the chin will be either in front or posteriorly, constituting the *mento-anterior* or *mento-posterior positions*.

The Mento-anterior Position.—In this position, the head may rest in the pelvic cavity either directly or obliquely, depending upon whether the chin has completely turned toward the pubes, or whether its aspect is to one or other of the lateral points of the excavation. In the former case, the head occupying the direct position, with the chin at the pubes and the forehead toward the sacrum, the forceps must be introduced in the same manner as if the occiput were at the pubes and the face regarding the sacrum. The blades being adjusted to the head and properly locked, the first tractions should be directed downward in order that the chin may be brought from under the pubic arcade; as soon as this is accomplished, not forgetting to protect the perineum by judicious support, the handle of the instrument is to be gradually elevated toward the abdomen for the purpose of completing the extraction of the face.

In the oblique or diagonal position, with the chin at either the left or right of the anterior surface of the pelvis, the same rules are to be observed in the introduction of the instrument as if the occiput regarded one of these points; when the head has been properly grasped, the first thing to be done is to produce a rotary movement from left to right, or from right to left, as the case may be, with a view of changing the position from the oblique to the direct. The delivery is then to be proceeded with as already described.

The Mento-posterior Position.—It is most fortunate that this position of the face is comparatively of rare occurrence. You have been told that, in face presentations, the persistent tendency of the natural effort is, through a special mechanism, to bring the chin forward either to the pubes or to one or other of the lateral points of the anterior portion of the pelvis. Nature, however, is occasionally contravened in this effort, and then she relies entirely on the discreet interposition of the accoucheur. Suppose you had an example of *mento-posterior position*, what course would you pursue? In the first place, you are to recollect that in no case, unless as an exception, if I may be permitted to say so, to an almost universal rule, can the head be made to accomplish its exit through the maternal organs, the chin continuing to remain in a posterior position.

When speaking of this position a few moments since, the face being at the superior strait, you were admonished of the difficulties attending it; these difficulties are in no way diminished after the face has descended into the pelvic cavity. When, therefore, you have become satisfied that nature is incompetent to bring the chin toward the anterior portion of the pelvis, and further delay would be perilous to the child, and not altogether without serious consequences to the mother, three indications will present themselves to the mind of the experienced accoucheur: 1. To endeavor by means of the forceps to bring down the vertex, by making an extreme downward and backward traction, and thus substituting a vertex for a face presentation; 2. To endeavor, by an adroit rotary movement with the instrument, to detach the chin from one of the posterior to one of the anterior points of the pelvis; 3. If the head should not have passed beyond the mouth of the uterus, and this latter be in a condition to justify the operation, version may be attempted.

These, then, are the three alternatives, the two first most difficult to accomplish, and, indeed, I may say the chances of failure greatly preponderating. Version, however, if the conditions premised be present, is much more feasible, and, in dexterous hands, may succeed. Hypothecating that these three alternatives should fail, is there any other resort left, or is the mother to be permitted to die undelivered? This is a grave question—but yet it must be answered. The last resort, perfectly justifiable under the circumstances, provided the child be dead, is craniotomy; should, on the contrary, there be satisfactory evidence that the child is alive, there may arise the momentous question—shall the child be sacrificed, or the chances of life between it and its parent equalized by subjecting the latter to the hazards of the Cæsarean section?

Before closing my remarks on the subject of face presentations, I may, I hope without the imputation of improper motives, be permitted briefly to narrate the two following instances in which I applied the forceps with safety to both mother and child; I am induced to refer to these cases, because they have, in my judgment, a useful practical bearing, and may, under similar circumstances, serve to remind you of your duty:

Dr. Oatman requested me to visit in consultation with him a lady, aged twenty-seven years, the mother of one child, three years old. She had been in active labor twenty-four hours before I saw her; the pains from the commencement had been strong, and she suffered greatly from their more or less constant recurrence, the slight intermission between them constituting a remarkable feature in the labor. The membranous sac had become ruptured three hours after the commencement of the parturition, but the mouth of the uterus was previously well dilated. Dr. Oatman, on making a vaginal exami-

nation, ascertained that the face presented; the head was slightly responsive to the vigorous contractions, but its descent into the pelvic cavity extremely slow; after the face had fully reached the excavation, it became arrested, and notwithstanding the continued powerful efforts of the uterus, it made no farther progress. The mother's strength was yielding under the influence of these repeated but fruitless contractions, and the child's safety in great peril from the pressure to which it was exposed. It was at this period of the labor that a messenger reached me requesting that I would promptly meet Dr. Oatman. I immediately obeyed the summons, and on my arrival found the condition of things as described above. The face exhibited an example of *mento-anterior* presentation, the chin being at the left of the pubes, with the forehead regarding the opposite sacro-iliac symphysis; in other words, the face rested in the left diagonal position. I soon became satisfied that nature had struggled long enough, but vainly, to produce on the head the rotary movement, which would have resulted in placing the chin in apposition with the pubes, and the forehead toward the sacrum.

The basis for this opinion was the evident exhaustion of the mother, together with the unusual tumefaction of the child's face, and the increased heat in the vagina; these phenomena, remember, accompanied by powerful but unavailing contractions of the uterus. There could be no doubt as to the course to be pursued under the circumstances; inaction on the part of the accoucheur, founded upon an abiding faith in the ability of nature to accomplish the delivery, would, without a doubt, have resulted most disastrously, for the evidence was abundant and unequivocal that, if this condition of things had been permitted to continue, the forces of the mother would have given way, and the life of the child sacrificed. What, therefore, was the indication? Why, evidently, to consume no time in idle expectation, but to proceed at once and render the needed assistance, so that, by opportune interference, the lives of both mother and child might be rescued from the dangers which threatened them. Dr. Oatman concurred entirely in this view of the case, and at his request I applied the forceps in accordance with the rules already indicated. As soon as the instrument had been adjusted on the head, I brought, by a rotary inclination, the chin to the pubes, thus changing the position from the diagonal to the direct; this being accomplished through proper tractions as previously described, I had no difficulty in bringing the head into the world. The child, a little daughter, was alive, and the mother had a favorable convalescence. Hesitation, or, perhaps, an hour's delay, would have rendered these agreeable results impossible.

On another occasion, I received a note from Dr. Judson to meet him under the following circumstances: He was in attendance on a lady in labor with her first child. She was twenty-one years of age,

and, with the exception of a delicate nervous organization, enjoyed good health. Her parturition commenced at six o'clock A.M. Dr. J. saw her at eight; the pains were slight, but the labor had fairly begun. After remaining for an hour with her, he left with the request that he might be notified as soon as his services were needed. At four o'clock P.M., just ten hours from the first indication of the parturient effort, he was again sent for. At this time, some progress had been made, the os uteri dilated to the size of a dollar piece, with increasing and recurrent pains. Things continued to progress; at seven o'clock the membranes ruptured, and there escaped an unusual quantity of liquor amnii. Soon after the rupture of the sac, the Dr. discovered the presentation to be that of the face. The pains increased in power, assuming an expulsive character; the head began to descend into the pelvic cavity; at ten o'clock it had passed to the lower strait, with the chin to the pubes and the forehead to the sacrum. The pains now assumed a strong expulsive force, and during one of them, the patient was suddenly attacked with convulsions, without any premonition whatever. In fifteen minutes there was a second convulsion, the pains becoming more marked and vigorous.

At this time, eleven o'clock P.M., I was requested to meet Dr. Judson. At half after eleven, when I arrived, I found the uterus contracting with full force, and nature doing all she could to terminate the delivery. The features of the face were excessively tumefied, and, notwithstanding the vigor of the pains, the head did not advance in a corresponding ratio. Twenty minutes after my arrival, the third convulsion occurred. These were all the facts of the case, and now the question to be determined was this—What, under the circumstances, was the most rational course to be pursued? My own opinion, frankly expressed to my friend, the doctor, was—that the convulsions were of eccentric origin, due altogether to the irritation of the incident excitator nerves of the vagina; and this opinion was grounded upon the important fact that the convulsive movement did not occur until this extreme pressure had begun to exert itself on the walls of the vagina; there had been no previous indication of any such nervous derangement; there was an entire absence of any hydropic condition, etc., indicating the presence of albuminuria. Supposing this view of the case to be sound, what was the necessary practical deduction as to our line of conduct? It was to remove, at the earliest possible moment, the cause of the irritation, and this could only be done by prompt artificial delivery. Therefore, as every instant of time was precious, at the doctor's request I applied the forceps, having first placed the patient under the full influence of ether. I was fortunate in extracting a living child. The mother had no recurrence of the convulsion, and was soon in the enjoyment of her usual health.

LECTURE XLI.

Cutting Instruments—What they Involve—Importance of the Question—What is the Smallest Pelvic Capacity through which a Living Child can be made to pass, and what the Capacity through which a Child may be extracted piecemeal?—Discrepancy of Opinion on these Questions—Symphysectomy, in what it consists—Sigault its Originator—The true claims of the Operation—The Question examined—Comparison instituted between Symphysectomy and the Cesarean Section—Statistics of each—Deduction—The Cesarean Section—The Opinions in Great Britain and on the Continent of Europe as to the Merits of the Operation—Reasons for the marked Difference of Opinion—Analysis of the Views of Authors touching the Cesarean Section—Statistics of the Operation—How its Fatality may be Modified—Opinion of the Author as to the Advantages of the Cesarean Section over Craniotomy—What are the Dangers of the Operation?—The Benefits of Anæsthesia in controlling the Shock to the Nervous System—Post-mortem Cesarean Section, when resorted to—The Case of the Princess of Schwartzemberg—The Roman Law on the Subject of the Post-mortem Operation—Method of Performing the Cesarean Section; the Vertical Incision through the Linea Alba preferred—Why?—Should the Operation be Performed before or after the Rupture of the Membranous Sac?—How is the Child to be Extracted through the Opening in the Uterus?—Rules for Removing the Placenta—Dressing the Wound, and subsequent Treatment—The Operation of Elytrotomy, as a Substitute for the Incision into the Uterus, proposed by Jorg and others—Merits of the Operation—Dr. Christoforis and the Resectio-subperiosteæ of the Pubic Bones—Researches and Statistics of M. Philan-Dufellay

GENTLEMEN—Having described to you the blunt instruments used in midwifery, their object, and mode of employment, the next topic for our consideration will be the cutting instruments which, when resorted to, must of necessity either destroy the child, if alive, or subject the mother to the hazards of a perilous operation. You see, therefore, in the discussion of this question, we approach a point, the most important, perhaps, so far as a just decision is concerned, in the whole range of obstetric science—a point which not only involves human life, but imposes upon the medical man the highest and most sacred obligations. In the examination of this topic, I shall, I trust, have my mind emancipated from the thralldom of bias or preconceived opinion, and shall endeavor to reach the truth through a proper sifting of evidence; for, after all, the employment of cutting instruments, whether upon the child or mother, is simply a question of testimony to be developed by surrounding circumstances, and determined by the honest judgment of the accoucheur and his associates in counsel.

Prerequisites for the Use of Cutting Instruments.—It should be

remembered that the fundamental prerequisite for a resort to these instruments is such a disproportion between the maternal organs and fœtus as to render it physically impossible that the latter can be made to pass, either through the natural effort, version, or by the aid of the forceps, *per vias naturales*; and this disproportion may arise from a contracted pelvis, the presence of osseous or sarcomatous tumors, a narrowing of the soft parts, an abnormally large child, or from malposition of the fœtus itself. In either event, however, the grave question presents itself, shall the cutting instrument be applied to the child, or to the mother? In the former case—assuming, of course, that the child is alive—it will inevitably be destroyed; in the latter, on the contrary, although the safety of the mother is in more or less peril, yet it is not necessarily compromised, and the chances of life are equalized between her and the child she carries within her. The decision of this question is, I repeat, of momentous import, and cannot be regarded lightly by the medical man who is governed by a high morality, and feels that there is nothing incompatible between the scientific physician and conscientious Christian.

Amount of Pelvic Contraction consistent with the Birth of a Living Child.—As to what really constitutes a contracted pelvis, such as will not permit the transit of a living child at full term, there exists a remarkable discrepancy of opinion; and this very circumstance, no doubt, will explain, in part at least, the conflicting views of authors regarding the justification for the employment of cutting instruments. For example, Busch, of Berlin, says, for a living child to pass, the antero-posterior diameter must measure from $2\frac{1}{2}$ to 3 inches; Burns $3\frac{1}{2}$; Dr. Joseph Clarke $3\frac{1}{2}$. Dr. Osborn* places it a fraction below 3 inches, while Dr. Ritgen is of opinion that a contraction of 2 inches is not inconsistent with the passage of a living fœtus at maturity! My own opinion, arrived at not without full consideration, and some share of experience, is that a diameter of $3\frac{1}{4}$ inches antero-posteriorly is the smallest possible space, except under very rare exceptional circumstances, through which a living fœtus at the end of gestation can make its exit,† and

* "Whenever a woman falls into labor, the small diameter of whose pelvis measures only $2\frac{1}{2}$ inches, one or other of the following circumstances must take place: 1. The child's head must be opened; 2. For the certain preservation of the child's life, the mother must be doomed to inevitable destruction by the Cæsarean operation; 3. As a mean between the two extremes, the mother must submit to the division of the symphysis pubis (symphyseotomy), an operation less dangerous to the patient than the Cæsarean section, but less safe for the child; or, if none of these means will be permitted, the wretched mother, abandoned by art to the excruciating and unavailing anguish of labor, will probably expire undelivered." [Essays on the Practice of Midwifery in Natural and Difficult Labor. By Wm. Osborn, M.D. 1792. p. 194.]

† See Lecture Fifth.

even with such capacity, more or less hazard and a protracted delivery will be the almost necessary result.*

Amount of Pelvic Deformity through which a Fœtus may be Extracted Piecemeal.—The same want of concurrence is noticed

* An exception, perhaps, to this rule may be made in certain cases of hydrocephalus, in which the bones of the head become so excessively yielding as to undergo an extraordinary pressure without destroying the life of the child. I saw a case of this kind some years since, which occurred in the practice of Dr. Hibbard of this city. He requested me to meet him in consultation under the following circumstances: The lady, aged twenty-nine years, was taken in labor with her first child at 5 o'clock A.M. The doctor saw her at 8 o'clock; the pains, before he arrived, had commenced with an unusual degree of force; he found, on examination, the os uteri fully dilated, the membranous sac ruptured, and the head beginning to descend into the pelvic cavity. The pains lost nothing of their expulsive character, but continued with regularity and vigor. There was, however, at 4 o'clock P.M., but a slight advance in the position of the head; at this time I saw the patient, being just eleven hours from the commencement of the labor. After giving a history of the case as above detailed, Dr. Hibbard requested me to examine the patient. The head rested diagonally in the pelvis, and had evidently continued to make progress under the strong contractions of the uterus, although the advance had been extremely slow. During an interval of pain, I again introduced my finger into the vagina, when I very distinctly recognised a peculiar condition of the head; it was flaccid to the touch, and the bones were movable, the one upon the other. What could this be? Was it because of the death of the child, and its putrefaction? This hypothesis was soon removed, because auscultation revealed the beatings of the fetal heart, and the mother, too, was conscious that her child was alive, for she very distinctly felt its movements.

Here, then, was an interesting state of things, and there was much need of sound judgment. Some writers place great confidence in the flaccidity and overlapping of the bones of the head as an evidence of the death of the fœtus; and, therefore, in the case now under consideration, if this evidence had been accepted as worthy of guidance, it might possibly have happened that, under the conviction that the child had ceased to live, a resort may have been had to the perforator and cruet for the purpose of bringing the dead fœtus into the world, and thus terminating the delivery. In these days of fondness for instruments, such an alternative is certainly not among the very improbable things of the lying-in room. From all the circumstances of the case, I had no doubt of the true cause of the flaccidity and overlapping of the bones, it was manifestly an example of hydrocephalus; in this opinion, I was happy to find Dr. Hibbard fully concurred. With this diagnosis, the question arose—What, under the circumstances, was the course to be pursued? It was agreed that the labor should be confided to nature, and for these obvious reasons: 1. The child was alive; 2. The strength and general condition of the mother were good. The pains continued with their wonted force, and at half-past three o'clock A.M., twenty-two hours from the commencement of the parturition, we had the satisfaction of witnessing the propriety of the course adopted in the birth of a living child; although alive, its head exhibited a most uncomely appearance, in consequence of the extreme elongation it had undergone, the occipito-mental diameter measuring nine inches. It soon, however, recovered from this temporary malformation, and survived its birth four months and one week. The mother had an ordinary convalescence. I was anxious to ascertain the true condition of the pelvis in this case, and in carrying the finger to the upper strait, it was quite evident that there was an unusual contraction in the antero-posterior diameter, which could not have presented a fraction over three inches.

among authors as to the extent of deformity through which it is possible to extract a child at full term, fragment by fragment, in the operation of embryotomy. Burns, for instance, justifies the operation, when there is a space of $1\frac{3}{4}$ inches; Hamilton $1\frac{1}{2}$; Osborn $1\frac{1}{4}$; Davis 1 inch! Dr. Dewees, on the contrary, thinks if the contraction be less than 2 inches, embryotomy should not be resorted to. I have endeavored to show (Lecture V.) that if the direct or antero-posterior diameter fail to measure from 2 to $2\frac{1}{2}$ inches, embryotomy cannot be accomplished without the almost certain hazard of laceration of the maternal organs, which may more or less involve life, or entail upon the parent sufferings to which death itself would oftentimes be preferable; and, therefore, I emphatically urge that the operation should not be attempted with a less space than $2\frac{1}{2}$ inches, with the single exception that the child be dead. Whether with this space, or even a greater one, it will ever be justifiable to resort to the perforator and crotchet, if the child be living, it will be our purpose to discuss as we proceed.

Deductions.—Taking, therefore, the two extremes, which, in my judgment, will be found correct, viz. a space of $3\frac{1}{2}$ inches for the passage of a living child,* and $2\frac{1}{2}$ inches to justify embryotomy, the question naturally arises—what is the rule of conduct, *when the pelvis shall present a contraction between these measurements, or below $2\frac{1}{2}$ inches, if it should be ascertained that the child is alive, and the woman at the full period of her gestation?* In the examination of this question, it must be constantly borne in mind that the alternative of choice is to rest altogether upon the simple but important issue—shall the child, known to be alive, be sacrificed, in order that the mother may be saved? or shall the mother be subjected to an operation, which, while it will involve her in serious peril, will afford a reasonable, or, if I may be permitted to say so, more than a reasonable, hope for the life of the child, thus, as it were, equalizing the chances between parent and offspring. If the latter course should be decided upon, the choice of operations to be performed on the mother, will be between what is known as *symphyseotomy* and the *Cæsarean section*; if, on the contrary, it be determined to destroy the child, then resort is to be had to *craniotomy*, *cephalotripsy*, or *embryotomy*, as circumstances may indicate.

I now propose to review in succession these various alternatives, yielding to each, as far as I can do so, its proper place in the scales

* I am aware that authors of integrity have recorded examples of living children being born, through the natural effort, when the abridgement was less than $3\frac{1}{2}$ inches; for example, Smellie and Baudelocque both cite cases of this kind, in which the head, natural and healthy, had undergone extraordinary pressure, and was expelled without compromising the safety of the child. But these are to be regarded as exceptional instances, and, therefore, cannot form the basis of a principle.

of right, and deducing from statistical data and other sources the basis of conduct by which the conscientious accoucheur is to be guided, *when, from disproportion between the maternal organs and fœtus, the latter cannot pass at full term, per vias naturales, except through the intervention of cutting instruments.*

1. *Symphysiotomy.*—This consists in a section of the symphysis pubis, with the view of giving such an increase of capacity, as to allow the exit of the child. The projector of this operation was a French medical student, named Sigault, who made it the topic of a memoir, which was presented to the Academy of Surgery in 1768; it was, however, not well received by the Academy. But Sigault, still firm in his conviction that he would be able to demonstrate the great fact that symphyseotomy was destined to become a substitute for the Cæsarean section, and entirely do away with the necessity of the latter operation, selected the same question as the subject of his thesis in the school of Angers in 1773.* It is due to this enthusiastic surgeon to state that, at first, he simply proposed to experiment on living animals, and then on condemned criminals; his essays on the dead subject having satisfied him of the correctness of his opinion as to the feasibility and advantage of the operation on the living woman in certain cases of pelvic deformity. As on most questions of science, the persevering demands of Sigault for an opinion soon gave rise to two parties, the one in favor, and the other adverse to the suggestion. Among the former, may be mentioned the learned Holland physician, the well-known Dr. Camper, who, in 1774, wrote a letter on the subject to Van Gesscher, entitled, *De Emolumentis Sectionis Synchondroseos Ossium Pubis in Partu difficili.*

Nothing, however, of a positively decided character developed itself in the minds of the profession, if we except the mere expression of opinion as to the anticipated benefits or evils of the proposed operation, until 1777, when Sigault, assisted by his friend, A. Le Roy, tested the feasibility of his theory, by resorting to symphyseotomy on a married woman, named Souhot, which resulted in safety to both mother and child. This woman, it appears, had previously borne four dead children. The success of the operation was like the electric current, for it winged its flight almost with the rapidity of lightning; for the time being, all doubts were at an end, and Sigault was the idol of Continental Europe. His name became one of honor; the poor student, who was ridiculed at first, was now the very centre of attraction; he was the originator of a new epoch in obstetric science; he had caused to be expunged from practice the "barbarous and deadly" Cæsarean section, and substituted in its stead the "rational and conservative" operation of symphy-

* The following is the title of the thesis: *An in Partu contra Naturam Sectis Symphyseos Ossium Pubis Sectione Cæsareâ promptior et tutior.*

seotomy. I am only quoting the words which were on every one's tongue at the period of which I speak. His fame was not limited to the adulations of the body of the profession, but he became the recipient of the highest honors of learned academies—the very academies which had originally nearly crushed his spirit by the unfavorable manner in which his “rational and conservative” proposition had been received! The Academy of Medicine of Paris voted him a medal, bearing the following inscription: “*Anno 1768, Sectionem Symphyseos Ossium Pubis invenit, Proposuit: Anno 1777, fecit feliciter M. Sigault, D. M. Ipsique, centum calculos illos esse offerendos. Juvit M. Alph. Le Roy, D.M.P. Cui quinquaginta offerentur calculi illi argentei.*”

In addition to this medal, making such honorable mention of Sigault, and his assistant, Alph. Le Roy, a royal pension was granted to the illustrious benefactor of the age. But this was not all; many an eloquent pen was busy with oblations of praise, and Sigault was lauded as the man, of all others, who had contributed a precious flower to the garden of science, and had conferred on womankind a blessing which would not fail to be appreciated in all time. Indeed, there was a perfect *furor* in public opinion, and Sigault was its subject. Panegyric after panegyric was issued from the press, and he must have grown giddy with the eulogiums of his admiring friends, one of the most enthusiastic of whom, Roussel de Vausmes,* supposed that nothing short of inspiration could have led the mind of Sigault to such a magnificent conception: “*At tandem Sigault, D.M.P. hæc alta mente diu revolvens solus divino quasi afflatus numine quam monstrarat natura viam ingreditur.*” Again: under the influence of the same unbounded enthusiasm, this writer predicts that posterity will not fail to regard symphyseotomy as among the most useful of operations: “*Non longam post elapsam annorum seriem, inter operationes maxime salutiferas annumeretur.*”

I have thus presented this brief and running sketch of the origin of symphyseotomy, and of the acclamation by which its first success was received, in order that you may understand how oftentimes it happens that human judgment, even in grave matters of science, is premature in its decisions because of the crudeness with which investigation is carried out. Here we find upon simple assumption, founded in the first instance on the success of a solitary case, the professional mind, as it were, becomes startled at what it deems a great fact—learned bodies are impelled by the enthusiasm of the moment, and their imprimatur is affixed to what the future proves to be the veriest phantom! There is a moral in all this too palpable to need comment.

Let us for a moment consider the objects of symphyseotomy,

* De Sectione Symphyseos Ossium Pubis Admittanda. Paris, 1778.

together with the results of the operation, and then determine whether, in any event, it can become the substitute for the Cæsarean section; or whether, under any circumstances, it should continue to receive the sanction of the profession as a humane or justifiable resort in the lying-in chamber.

Its Objects.—The most ardent advocates of symphyseotomy based the motive for its performance upon the exclusive facts—that it would so far increase the capacity of a deformed pelvis as to permit a living child to pass, and that it is a less dangerous operation than the Cæsarean section. Ample experiment has very satisfactorily shown that it is not possible, by the separation of the symphysis pubis, to obtain in the direction of the antero-posterior diameter, at the utmost, an increase *beyond half an inch*, and in accomplishing this there will be the serious hazard of lacerating the sacro-iliac synchondroses. If this be true—and the fact is, I think, universally conceded—it follows that no good result can be expected to the child if the contraction of the antero-posterior space should be a fraction under $2\frac{3}{4}$ inches, for we hold that a living child cannot be made to pass if this diameter be less than $3\frac{1}{2}$ inches; and even with that allotment the difficulty will be very great. As the chief motive for symphyseotomy is to save the child, that object would most certainly be defeated, if the space were much short of $2\frac{3}{4}$ inches. Another very important circumstance to be taken into account—and about which there is a general assent among authors—is that in consequence of the posterior relations to the pelvis of the sacro-iliac synchondroses, it ensues, as a necessary physical fact, that the greatest space obtained by this operation will be: 1. In the oblique diameter of the pelvis; 2. In the transverse; and, 3. In the antero-posterior.

Now, if it be remembered that it is the abridgment of the antero-posterior diameter, which in the first place constitutes the obstacle to the delivery, and, secondly, the motive for a resort to the operation, it would seem to follow, not only as an irresistible logical *sequitur*, but as an essential practical deduction, that unless symphyseotomy will afford an additional space between the pubes and sacrum, such as beyond all peradventure will permit the passage of a living child, it fails to secure the object for which its advocates have contended; and, under the circumstances, in addition to the risks of the operation itself, it would become necessary to superadd the dangers to the mother of embryotomy, not to speak of the consequent sacrifice of the child.

But let us suppose that the antero-posterior diameter shall measure $2\frac{3}{4}$ or even 3 inches—is symphyseotomy, with this space, indicated? Its friends—If there be any now left—would perhaps be shocked at such an interrogatory. I have no hesitation, however, in saying, that in any case in which the division of the pelvic bones has been

recommended, I should myself, as an alternative, prefer the Cæsarean section, for the obvious reason that I believe its dangers to both mother and child to be less than those involved in the operation of symphyseotomy. It has, I think, been shown that the first argument of the symphyseotomists—the acquisition of an increased space—when the contraction is less than $2\frac{1}{4}$ inches, is worthless in practice; and their second argument—that the operation is more conservative to parent and child—will be proved to be equally fallacious, as we shall see by a glance at the statistics of the two operations.

Statistics.—It would appear that, in symphyseotomy, one mother is lost in every three, and one child in every two. These, it must be remembered, are simply the aggregate results of the operation; there is no account taken of the serious and not unfrequently remote fatal issues to the mother in consequence of the injury inflicted on the soft parts, more particularly the bladder and uterus, to say nothing of the permanently crippled condition of the unhappy parent, which has occurred in more than one instance. If we now compare this table with that of the Cæsarean section, we shall find that in the latter one mother is lost in $2\frac{1}{2}$, while more than two thirds of the children are saved. Here, it is true, more mothers die, but the safety to the child is greatly increased. When, however, a woman recovers from the Cæsarean section, she has not entailed on her the accidents which so commonly result from symphyseotomy, but she enjoys good health, and is not disqualified from attending to her ordinary duties, as is proved by the fact—which has repeatedly occurred—of the same woman having been subjected to the operation several times, and with success to her and her child.

Again: the results to the mother from the Cæsarean operation just given, are not, in my opinion, to be regarded as fair exponents of its positive fatality, for they are taken from mixed cases, the great majority of which were no doubt operated on *in extremis*, when the vital forces, from previous effort, had been so dilapidated as greatly to tend against recovery; and, as we proceed in the investigation of this question, I shall endeavor to demonstrate that *the Cæsarean section would be far more favorable to the safety of the mother if, as a general principle, it were resorted to earlier, and not left, as has been too often the case, until the last spark of life is near extinction.* I can comprehend no difference, in this essential particular, between the Cæsarean section and any other capital surgical operation. In the latter, is not the great element of success an opportune and timely resort to the knife, when the system is best prepared to resist the shock, and in condition to lead to recovery? The truth of this no one will doubt, and yet, so far as the Cæsarean operation is concerned, this great conservative principle

has been sadly neglected. Therefore, for the reasons stated, my advice to you is to repudiate, as altogether unjustifiable, because without an equivalent for the hazard it involves, a recourse to symphyseotomy.

2. *The Cæsarean Section.*—This operation consists in an incision through the abdominal walls and uterus of the mother, for the purpose of extracting the child; this, at least, is the generally accepted definition. The definition, however, is too circumscribed, for, in strict construction, it is still the Cæsarean section, whether the child be extracted by an opening through the abdominal parietes or vagina; hence it has been, I think, properly divided into *abdominal hysterotomy* and *vaginal hysterotomy*, depending upon whether the incision into the uterus be through the abdomen or vagina. I do not deem it necessary to enter into any special discussion touching the early history of this operation; I prefer rather to direct your attention to the important question—*Under what circumstances is the Cæsarean section justifiable, and what, as a conservative resource, are its true relations to craniotomy?*

Few subjects, perhaps, in midwifery have given rise to more serious discussion, and called forth more decided opinion, both for and against, than the very question which we are now to consider. Here, we find the controversy not limited to mere individuals, but it has, in the full sense of the term, become what may be truly called *national*. In Great Britain, for example, the almost universal voice of the profession is in favor of craniotomy in preference to the Cæsarean section; the writers and practitioners of that commonwealth, as a very general principle, avow that there is no comparison to be instituted between the value of the life of the mother and that of the child; and, therefore, in cases requiring cutting instruments, the perforator and crotchet are resorted to, whether the child be living or dead. On the Continent, on the contrary, the reverse of this obtains; and craniotomy is, comparatively, much less frequently practised than the Cæsarean section. It does really seem to me that, amid the conflict of sentiment, which has and still continues to exist on this vexed topic, facts have had too frequently to yield to an inflexible determination not to surrender preconceived opinion; in this way, and under the influence of a false principle, the human mind is oftentimes fettered in its judgment, and, as a consequence, much harm is entailed both upon science and humanity.

Discrepancy of Opinion touching the Cæsarean Section.—I wish you distinctly to bear in memory that the controversy, with regard to the benefit or evil of the Cæsarean operation, seems to rest on the contrast which authors have, in their own minds, instituted between it and craniotomy, and also on the respective value which they affix to the life of the mother and child. It is worthy

of recollection, too, that the deductions of both parties are sometimes from very false premises, as I hope to demonstrate before closing this lecture. It may not be without profit to array before you the opinions of some of the leading authors on this subject, and you will appreciate, in perusing their conflicting notions, the maxim—*Quot homines tot sententiæ*, which may be liberally translated: *As men's features differ so do their opinions*.

Dr. Osborn* says, "The valuable life of the mother should never be exposed to *absolute destruction* by the Cæsarean operation for the *certain safety* of the child. The perforator should be had recourse to without reference to the life of the child."

Mauriceau† writes, "The Cæsarean section should never be performed on the *living woman*; it is an inhuman, cruel, and barbarous operation."

Baudelocque‡ holds, "*To mutilate a living child, in order to avoid the Cæsarean section*, is the offspring of ignorance and inhumanity; nothing can excuse the practitioner who will have recourse to the perforator or crotchet without *first being certain that the child is dead*."

Gardien§ says, "It is with good reason that prudent accoucheurs, in view of the *fatal results of embryotomy*, prefer the Cæsarean operation."

Dr. Weidemann|| "recommends the Cæsarean section in every pelvic deformity in which a *living child cannot be delivered by other means*;" and he is most emphatic in his denunciation of the crotchet and perforator, for the following is his decided language, characterizing the destruction of a living child by these means a monstrous crime: "*In fœtum vivum, uncas et perforatoria adigere, nefandum facinus est*."

Sme'tie,¶ England's great obstetric light, speaks thus: "When a woman cannot be delivered by any of the methods recommended in preternatural labors, *on account of the narrowness or distortion of the pelvis, etc.*; in such emergencies, *if the woman is strong and of good habit of body, the Cæsarean operation is certainly advisable, and ought to be performed*; because the mother and child have no other chance to be saved, and it is better to have recourse to an operation which hath sometimes succeeded, than leave them both to inevitable death."

Sir F. Ould says, "The Cæsarean operation is most certainly

* *Essays on the Practice of Midwifery*, p. 225.

† *Traité des Maladies des Femmes Grosses*, vol. i., p. 352.

‡ *L'Art d'Accouchement*, vol. ii., p. 220.

§ *Traité complet d'Accouchement*, p. 103.

|| *Comparatio inter sect. Cæsar. et dissectionem cartilag. et ligament. pelv. in partu ob. pelv. august. impossib.*

¶ *Midwifery*, vol. i., p. 239.

mortal, and I hope it will never be in the power of any one to prove it by experience."

Merriman* speaks thus: "It cannot be matter of much surprise that, *with so little success as has attended the Cæsarean operation in England*, the British accoucheurs should be so reluctant to perform or adopt it; and, therefore, *recourse is never had to it, except in such deplorable cases only as preclude the possibility of delivery by any other means.*"

Blundell† says, "*It is an axiom in British midwifery, that we are never to deliver by the Cæsarean operation, provided we can, in any way, deliver by the natural passages. I feel persuaded that women might sometimes be more safely and more easily delivered by the Cæsarean section, than by the passages of the pelvis; but if, acting on this persuasion, we were once to establish the principle, that the Cæsarean delivery may be used as a substitute for delivery by the perforator, there would, I fear, be too many cases in which it would be needlessly adopted; and men would now and then, not to say frequently, perform this operation in circumstances in which it ought never to have been dreamed of. Where embryonic delivery is practicable, let it be preferred.*"

Dr. Maunsell‡ observes, "The truth is, that in Great Britain the Cæsarean operation never did, and never will, flourish."

Dr. Murphy§ advises, "In order to decide upon the Cæsarean section, you should weigh carefully the *probable result to the mother, if the operation be not performed*; and if it appear to you that perforation is impracticable, or so difficult to perform that the danger seems to be nearly so great to the patient as opening the uterus, you are then authorized to undertake the operation, because, if there be a probability that *perforation will not ensure safety to the mother, you are certainly bound to consider the child, and give it a reasonable chance for its life.*"

Sufficient, I apprehend, has been done in the way of quoting authorities to demonstrate the extraordinary discrepancy of opinion on the question we are now considering; and it will be well to remind you that the writers I have cited are of no mediocre position; on the contrary, they are men of eminent name. How is this difference of sentiment to be reconciled? on what principle of reasoning can it be satisfactorily explained? One would imagine that, according to every principle of logic, legitimate deductions are the necessary results of a legitimate construction of well-founded data. Is it, therefore, not true that many of these authors have given less consideration to this character of data than they have to

* Synopsis of Difficult Parturition, p. 166.

† Principles and Practice of Obstetric Medicine, p. 371.

‡ Dublin Practice of Midwifery, p. 139.

§ Lectures on Principles and Practice of Midwifery, p. 202.

their own prejudices or preconceived notions? I think so, and it is in this way only that I can account for the remarkable want of concurrence on a topic, involving so grave and sacred an interest as that of human life. When I speak of data, in connexion with this subject, I allude to certain statistical testimony, which, if properly discriminated, will oftentimes constitute, in questions such as we are now discussing, a very essential element for opinion; but do not forget that, for this testimony to become a recognised and safe substratum, it should be duly eliminated with the sole view of sustaining a fundamental truth, and not for the purpose of affording apparent strength to individual sentiment. In one word, individual opinion should always yield to well-established facts, instead of attempting to accommodate facts to opinion.

In order to illustrate what I desire most earnestly to urge, let us suppose that a certain number of you had decided in your own minds that, in consequence of the far greater value which you attach to the life of the mother than to that of the child, you would, under no circumstances, hesitate between the Cæsarean section and embryotomy, but that, in all cases calling for cutting instruments, your choice would be a resort to the latter expedient. Such a decision, I think you will agree with me, is legitimately entitled to be considered the offspring of preconceived opinion, and, as such, it would, of course, ignore the testimony of well-attested facts. Decisions like these, are, I maintain, unworthy of science; they are one-sided, and, therefore, cannot be truthful. This brings me to the reiteration of what I have already stated in a previous part of this lecture—that the choice between the Cæsarean section and other modes of extracting the child, must be determined by a just balancing of evidence; and, with this conviction, I shall now proceed to lay before you, as briefly as may be consistent with the import of the question, the particular kind of evidence by which, according to my judgment, we are to be guided.

Contrast between the Cæsarean Section and Craniotomy Statistics.—You have already seen that the Cæsarean operation meets with but little favor in Great Britain, while, on the other hand, craniotomy has for a long time been, and still continues to be, honored by the general endorsement of the profession of that enlightened nation. In order that you may at once appreciate the relative frequency of this alternative in Great Britain and on the continent of Europe, I will present you with the following tables, which I derive from Dr. Churchill: Among British practitioners, 517 crotchet cases in 150,381 deliveries, or about 1 in 291; among the French and Italians, 69 crotchet cases in 38,908, or 1 in 563 $\frac{3}{4}$; and among the Germans, 386 crotchet cases in 646,645 deliveries, or 1 in 1,675; altogether, 835,934 labors in which the crotchet was

used, or 1 in 1,120 $\frac{1}{2}$.* The mortality for the mothers is 1 in every 5; and, of course, the very nature of the operation demonstrates that all the children are sacrificed. But, gentlemen, it is essential you should note the important fact that these tables give us only the *immediate* deaths, in the proportion of 1 to 5 of the women who have been subjected to the hazards of craniotomy; not one word is said of the dreadful lacerations and destruction of the soft parts, sometimes terminating fatally, involving too frequently the unhappy sufferer in distress and anguish, which would cause her to invoke death as a blessing!

Dr. Maunsell† says, "Dr. Joseph Clarke found it necessary in the Dublin Lying-in Hospital, to use the perforator in 1 in 208 cases. In the Wellesley Female Institution, it was employed during the year 1832, 1 in 211 $\frac{1}{2}$ cases; and during the year 1833, 1 in 137 cases." This record would seem to show a striking average difference in the frequency of the operation, as exhibited by the statistics of Dr. Churchill; and what, it seems to me, must be apparent to every reflecting mind is, that these tables of Dr. Maunsell, presenting the number of craniotomy operations in well-conducted hospitals, supervised by men of eminent skill, must fall greatly short of the true average frequency of this alternative among the profession in outdoor or private practice, where oftentimes "hot-haste" and dispatch are substituted for patience and sober judgment!

Again: Dr. Joseph Clarke mentions that in the 49 craniotomy operations performed by him in the Dublin Lying-in Hospital, 16 women out of the 49 died, or about 1 in 3; not 1 in 5, according to the statistics of Dr. Churchill. Thus, the sad result—16 of the mothers lost, and all the children destroyed in 49 cases; and yet it is but fair to presume that in the hands of Dr. Clarke, a gentleman of acknowledged skill and experience, assisted as he no doubt was, in counsel, by other eminent practitioners, this mortality is much less than when the operation is performed indiscriminately in private practice, and, alas! in instances in which there is too often a want, not only of proper deliberation as to the necessity of the alternative, but of ordinary dexterity in the execution of the deed.

It is proper now, in the way of contrast, to turn to the results of the Cæsarean section. It would seem that the mortality to the mothers in this operation is 1 in 2 $\frac{1}{2}$, and to the children 1 in 3 $\frac{1}{2}$. The deaths, therefore, among the mothers are much greater than in craniotomy, for, according to Dr. Churchill's tables, in this latter, the fatality is only 1 in 5. Yet, on the other hand, in 49 cases of craniotomy occurring in the Dublin Lying-in Hospital, under Dr. Joseph Clarke, 16 mothers were sacrificed, or 1 in 3! This certainly reveals a melancholy picture, and it needs no argument to

* Theory and Practice of Midwifery. London, 1860: p. 371.

† Dublin Practice of Midwifery, p. 138.

show, according to this latter table, how much more destructive to human life, if we embrace the fatality to both mothers and children, is craniotomy than the Cæsarean section; for, in the practice of Dr. Clarke, a practitioner of sound judgment and ripe experience, in 49 cases there was the dreadful sacrifice of 65 lives, supposing the children to have been alive at the time of the operation! Nor does history record the condition of the 33 mothers who survived, whether they were with or without lacerations.

Thus, if we adopt Dr. Maunsell's record, as a proximate basis for opinion in reference to the relative mortality of the two operations, the Cæsarean section and craniotomy, the evidence will be greatly in favor of the former expedient; for while in craniotomy 1 in 3 of every mother is sacrificed, to say nothing of the contingent injuries, which, if they do not ultimately lead to death, will oftentimes impose upon the surviving mother a life of more or less suffering, every child is necessarily sacrificed. In the Cæsarean operation, on the contrary, one child only is lost in every $3\frac{1}{2}$, and one mother in every $2\frac{1}{2}$. If, then, we suppose the Cæsarean operation to be performed in 49 instances, we shall have, in contrast with 65 deaths, as in craniotomy, a very different result; 1 death in $2\frac{1}{2}$ of the mothers, and 1 in $3\frac{1}{2}$ of the children.

But, gentlemen, I wish to direct your attention very emphatically to another point in connexion with the statistics of the Cæsarean section as furnished by Dr. Churchill; and in doing so, I shall endeavor to prove to you that they are not substantial data for a just comparison between the relative fatality of the two operations. In the first place, the number of Cæsarean operations cited by him are what may be termed mixed cases, including those of Great Britain, the continent of Europe, and some in our own country. It is very well known that, more especially in Great Britain, in consequence of the very decided prejudice against the Cæsarean operation, it has not been resorted to, in the great majority of instances, until the life of the mother was nearly extinct from previous effort, and her forces so prostrate as to deprive her of the elements essential to recuperation. Again: I think this objection is true, also, but not to the same extent, as regards the cases derived from the continents of Europe and America, for it cannot be denied that, whatever may be the individual preference for the Cæsarean operation over craniotomy, there is more or less repugnance to commence it, and hence the general delay. If, in addition, we consider the effect on the mind of the patient when told that, in the best judgment of her medical advisers, the alternative for her life and that of her offspring is—to *cut the child out of her womb through an incision of her abdomen*, it is not difficult to appreciate why, under the combination of protracted delay, and prostration, through fright, of the nervous force, one mother in every two and one third should

be sacrificed. I am free to confess I am not a little surprised that the mortality is not far greater in view of the circumstances just alluded to.

It is a fact highly commendatory to their sagacity, and which, at the same time exhibits, I think, ample evidence of sound thought, that, as early as the sixteenth century, some of the writers on the question now before us gave very significant counsel, all other things being equal, as to the particular *time* during the labor of performing the Cæsarean operation; and I am strongly impressed with the conviction that, had their counsel been hearkened to, great would have been the gain to the parturient woman. Rousset and Ruleau (the former wrote in 1581, the latter in 1704) recommended in the most decided manner that "*the Cæsarean operation should be performed before the rude manipulations of the accoucheur had injured and more or less exhausted the woman.*" Levret,* the great obstetric authority of his times in France (1750), says, "As soon as the labor has fairly commenced it is proper to proceed with the operation, in order that the most favorable time may be selected for the operation itself, as well as for its consequences." With the sound advance which surgery has made in the present century, it is strange that more attention has not been given practically to these fundamental precepts, for no really experienced surgeon, I apprehend, will attempt either to controvert their wisdom, or the influence they must necessarily exercise on the final issue of the Cæsarean section.

Therefore, I am quite confident, if the alternative were more *opportunistically* resorted to; if, in a word, the same principle of guidance should obtain in reference to it, which we find to constitute the rule of action in all capital operations, the result would be vastly different; and I have no hesitation in saying that, under these favorable circumstances, the Cæsarean operation would not only prove to be infinitely less destructive to human life than craniotomy, but that it would soon take its rightful place as a just expedient in the lying-in chamber. The evidence in demonstration of the soundness of this opinion seems to me to be entirely satisfactory; for, in addition to other proofs, we have the strong corroborative testimony furnished by those examples in which the Cæsarean operation has been performed several times on the same woman, with success to both mother and child; and in which cases, it is fairly to be presumed that, at least, if not the first operation, the subsequent ones were undertaken *opportunistically* before the strength of the mothers had become exhausted by antecedent and protracted effort. As a matter of statistical information, it is proper that I should refer to the following data furnished by Keyser of Copenhagen, although

* Levret, Suite des Observations sur les Causes des Accouchemens Laborieux, p. 244.

they are somewhat adverse to the position I have just assumed. I cannot but think there is some error in the details of the cases he cites. Keyser, taking the time of the operation from the commencement of labor, reports as follows: first 24 hours, mortality to mothers 0.67, infants 0.28; between 25 and 72 hours, 0.55 to mothers, infants 0.33; more than 72 hours after labor commenced, mortality to mothers 0.72, to infants 0.60; so that between 25 and 72 hours it was most successful to mothers.*

M. Simon† (1749) presented to the Academy of Surgery a collection of sixty-four cases of the Cæsarean section, in more than one half of which the operation occurred in thirteen women, some of these having been operated on two, three, five, six, and even seven times, and all were successful; singular enough, most of these operations were without good cause, for, of the sixty-four women, thirteen had borne children naturally either before or subsequent to the section. Stoltz, of Strasbourg, mentions fourteen undoubted cases in which the Cæsarean section was resorted to with complete success twice on the same patient. Michaelis reports a case of a female, named Adawetz, born in 1795; she was four feet high, affected with rickets, and the antero-posterior diameter at the upper strait measured two and a fourth inches. In 1826, Dr. Zwanck delivered her by the Cæsarean section; the child had been dead for some time previously to the operation, but the woman recovered. In 1830, this patient was again delivered through the same means by Prof. Weidemann, mother and child both saved. In 1832, the Cæsarean section was resorted to for the third time, and the result was equally fortunate to parent and infant.

Klein has gathered with much care 116 Cæsarean sections, of which 90 were successful.‡ Dr. John Hull gives an analysis of 112 cases, of which 90 were successful.§

Halmagrand,|| the able annotator of Maygrier, collected between the years 1835 and 1839 fifteen cases of Cæsarean operation; of these, twelve of the mothers and thirteen of the children survived, while three of the mothers and two of the children were lost; thus one mother in five died, and one child in about seven. These facts are well worthy of meditation, and in connexion with them it may be added that, in each of the fifteen cases recorded by Halmagrand, the only cause for resorting to the operation was a rachitic condition of the woman. This author well asks, whether this extraordinary comparative success may not in part be due to the circumstance that the operations were performed early, and before

* London and Edinburgh Medical Journal, p. 542.

† Premier volume des Memoires de l'Academie de Chirurgie.

‡ Loder's Journal, vol. ii., p. 759 760.

§ Observations on Cæsarean Operation. Manchester, 1798. P. 292.

|| Nouvelles Démonstrations d'Accouchements. Par Maygrier, p. 461.

the system had become exhausted by fruitless effort. These statistics, it will be perceived, are beyond all contrast in favor of the Cæsarean section over craniotomy.

I desire it to be distinctly understood that my preference for the extraction of a living child through the abdomen of the parent, over its mutilation, is not an opinion of very recent date, nor has it been arrived at, I trust, without due consideration. It is the opinion I have held and inculcated during my professorial life, as can be attested by the numerous pupils and others who have resorted to our University for instruction. In my translation of Chailly's *Midwifery** (1844), I emphatically expressed my views upon the question of craniotomy in the following unequivocal language: "In truth, it needs some nerve, and for a man of high moral feeling much evidence as to the necessity of the operation, before he can bring himself to the perpetration of an act, which requires for his own peace of mind the fullest justification. He who would wantonly thrust an instrument of death into the brain of a living fœtus, would not scruple, under the mantle of night, to use the stiletto of the assassin; and yet, how frequently has the child been recklessly torn piecemeal from its mother's womb, and its fragments held up to the contemplation of the astonished and ignorant spectators as testimony undoubted of the operator's skill! Oh! could the grave speak, how eloquent, how damning to the character of those who speculate in human life, would be its revelations!" Such, gentlemen, was my language in 1844; and now, in 1861, with a more matured judgment and a riper experience, I am, if possible, the more strengthened in my conviction.

Therefore, in the fulness of my faith, I have no hesitation in saying that, *if the child be alive, the woman at the completion of her pregnancy, and it be made manifest that the maternal passages are so contracted as to render it physically impossible that a living child can be extracted per vias naturales, I should between the two resources—craniotomy and the Cæsarean section—not hesitate to decide in favor of the latter.*† I am quite aware that this opinion, so emphatically stated, is at variance with the general views of the profession on this subject; but it has one merit, if no other, it is sincere, and founded upon what I believe to be an honest analysis of all the evidence. In more than one instance on record it has been shown that embryotomy has been had recourse to, and living children mutilated, when the women in subsequent labors were

* A Practical Treatise on Midwifery. By M. Chailly. Translated from the French. Fifth edition, p. 385.

† It is proper here to remark that if it be ascertained the child is a monster (although alive), or that it is affected with disease, which would result in its destruction soon after delivery, this might constitute an exception to the rule.

delivered by means of the Cæsarean section, with safety both to themselves and their offspring.*

Dr. Charles S. Mills, of Richmond, Va., reports a case of Cæsarean operation of more than ordinary interest, in which he saved both mother and child. The special interest of the case consists in the important fact that efforts were first made, because of the indisposition to resort to the Cæsarean section, to deliver by embryotomy. His associates in counsel were Drs. Deane, Bolton, and Drew. The following is the language from the record: "It was now proposed that the patient should be anæsthetized, and an effort made to reach the abdomen of the child in order to eviscerate it, if, after a more thorough examination, it should appear that the child could then be brought away. This was accordingly done, and Dr. Bolton with great difficulty succeeded in passing two fingers through the superior strait so as to reach with their extremities the abdomen of the child, but could make no use of them to conduct an

* The following case I take from the North American Medical and Surgical Journal, No. XXIV., October, 1831, p. 485, reported by George Fox, M.D.:

Mrs. R., twenty-six years of age, was married 16th of May, 1830, and on the 14th of June, 1831, was in labor with her first child. Dr. George Fox was called to her assistance, and, finding that there was deformity of the pelvis, requested the counsel of Prof. James and Meigs, and Drs. Lukens, Hewson, and J. R. Barton. It was concluded, after repeated examinations, that the antero-posterior diameter did not exceed two inches. "The question arose as to what was to be done. The Cæsarean operation was thought to be attended with so much risk to the mother as almost to be necessarily fatal, some of the most distinguished surgeons being entirely opposed to its performance; and Dr. Physic, who was called upon for his opinion on the propriety of this operation, was decided and positive in his opposition to it; under the weight of such authority, the idea of the Cæsarean operation was abandoned." It was then determined to perform cephalotomy, and Prof. Meigs agreed to undertake it. Before he commenced the operation, however, Prof. M., conceiving, after further examination, that "cephalotomy would be attended with as much risk to the life of the mother as the Cæsarean operation, thought it better to call another consultation to reconsider the propriety of performing the Cæsarean operation." The consultation resulted in the opinion that the child was dead. Cephalotomy, therefore, was performed. On the 22d of June, 1833, this same female was again in labor with her second child. Prof. Meigs was called in, and performed a second time the operation of cephalotomy. But we not told that in this case the child was dead; therefore, it is to be presumed it was alive.

On March 25, 1835, this heroic woman was taken in labor with her third child. Dr. Joseph G. Nancrede was her physician, and, after mature deliberation, decided that the Cæsarean section was the only appropriate operation in her case. Dr. Nancrede requested the counsel of Prof. Gibson, who concurred in opinion with him. Accordingly, in the presence of Dr. Nancrede, Prof. Dewees, Dr. Dove, of Richmond, Prof. Horner, Dr. Beattie, Dr. William Cox, Dr. Theodore Dewees, and Dr. Charles Bell Gibson, the distinguished professor performed the operation with entire success, saving both mother and child.

November 5, 1837, Prof. Gibson was summoned to this patient, who was again in labor with her fourth child!! He again performed the Cæsarean section, and with the same success, saving both mother and child. These facts must carry with them their own comment.

instrument with certainty or safety to the mother, and was of opinion that it would be impossible to deliver the child through so narrow a passage even if he could succeed in eviscerating it. Being still loath to resort to the Cæsarean section, until every effort to deliver *per vias naturales* had been tried and failed, the presenting leg was now enveloped in a bandage, and, the mother still being under the influence of chloroform, gradual but very powerful traction was made, hoping still to force down the body into the pelvis. The greatest force which could be applied without risking the laceration and separation of the limb, produced no other effect than to bring down the thigh a little lower. Upon consultation, it was now unanimously thought that the Cæsarean section should be made without further delay." Fortunate, indeed, was it that the attempt at embryotomy proved abortive, for it enabled Dr. Mills, through the exercise of his skill, to save two lives, one of which would necessarily have been sacrificed, and the other subjected to more or less hazard.*

Dangers to the Mother of the Cæsarean Section.—Let us now, for a moment, inquire in what consist the dangers to the mother in this operation. They are enumerated as follows: 1. Shock to the nervous system; 2. Hemorrhage, or an escape from the uterus of the liquor amnii into the peritoneal cavity; 3. The possibility of a portion of the intestines becoming compressed and strangulated, either in the opening of the abdominal parietes or uterus itself; 4. Inflammation involving the uterus, or peritoneum.

In reference to these several dangers, the most serious is peritoneal inflammation together with its complications; and yet, from the statistics we have given, it would appear that the peril from this influence is not extravagant. Indeed, we have numerous and extraordinary instances of recovery after serious injury to the peritoneum and intestines from traumatic causes, such as the goring of an ox,† stabs in the abdomen, or the rude and unskilful cutting into the gravid uterus by unprofessional hands.‡ Cases, too, are recorded and accepted as reliable, in which women have undergone the

* Monthly Stethoscope and Reporter, July, 1856, p. 427.

† Fritz records a singular case, also witnessed by Naudot, of a pregnant woman having been gored in the abdomen by the horn of an ox; on the following day the wound was enlarged by means of a bistoury; the fetus was extracted, and the mother recovered! (See Velpeau's Mid., p. 548.)

‡ The Cæsarean operation was performed on a female in Ireland, named Alice O'Neal (1733), by an ignorant midwife, Mary Dunelly; the instrument employed was a razor; she held the lips of the wound together with her hand till some one went a mile and returned with silk and the common needles which tailors use; with these she joined the lips in the manner of the stitch employed ordinarily for harelip, and dressed the wound with white of eggs. The woman recovered in twenty-seven days. This case, incredulous as we may be disposed, is regarded as perfectly truthful.—Edinburgh Medical Essays, vol. v.

Cæsarean operation after rupture of the womb, and have survived. These facts, I think, tend to demonstrate that, if all things be equal, the positive danger from inflammation *per se* is not as grave as is generally imagined; and this brings me to the repetition of one of the major propositions, that the serious peril of the Cæsarean section is, in a great measure, due to—at all events, it is greatly enhanced by—the unnecessary delay of the operation, when the woman's strength is exhausted, the womb and the adjacent organs fretted, and sometimes even inflamed through the jointly abortive efforts of nature and the injurious officiousness of the accoucheur; so that, oftentimes, a broad foundation for fatal results is already laid before the first stroke of the surgeon's knife.

As to the other alleged dangers, such as the passage of blood or liquor amnii from the incised womb into the peritoneal cavity, or the strangulation of a fold of the intestines, why these, I contend, are not necessarily incident to the operation; they are chargeable to the carelessness of the assistants, whose duty it is, by efficient service, to see that these various contingencies do not occur.

But the shock to the nervous system, you may urge, is a very important complication. Yes, gentlemen, this argument, I admit, was not without force, and great force, too, before the introduction into the lying-in room of that sterling boon to suffering woman—*anæsthetics*. It is in operations like the Cæsarean section, in which the nervous system is thrown into tumult and disorder, and where psychical causes have an unbridled sway, that the magic of *anæsthesia* discloses its full triumphs. Under its influence, the human system, emancipated for the time from the operation of external impressions, is lulled into more than the quietude of sweet and unbroken sleep. We have, therefore, in *anæsthesia* an important addition to our therapeutic agents which, when judiciously employed, cannot but afford most happy results; the subjection in which it holds the nervous system, under capital operations, is displayed not only in the unconsciousness of pain, but in the shield it affords against the consequences of the shock otherwise so apt to ensue.

Indeed, if the importance of the uterus in its various connexions with other portions of the economy be recollected, it cannot appear strange that a lesion of this organ should be followed by marked pathological effects on the nervous system, and that these results on the nervous mass should, before the introduction of *anæsthesia*, have been prominent among the causes of the comparatively great fatality of the Cæsarean section. As a general rule, it has been observed that when death ensues soon after the operation—say two or three days—it is in consequence of the grave concussion sustained by the nervous system, as is evinced by the symptoms, which, under these circumstances, so speedily develop themselves,

such, for example, as a general sinking of the forces, vomiting and hiccough. In these cases, I repeat, in which death so rapidly follows the operation, the true cause of destruction is not inflammation of the peritoneum, uterus, etc., but is to be traced to the profound impression to which the nervous system has been subjected.

Post-mortem Cæsarean Section.—Before describing the manner in which—when indicated—the Cæsarean operation is to be performed, it is proper I should remind you that it sometimes becomes necessary to resort to this expedient even after the woman is dead; and the practice is founded upon the well-known fact that the fœtus does not necessarily die simultaneously with its mother. Indeed, there are numerous instances cited in which the *post-mortem* Cæsarean section is alleged to have been had recourse to twelve, twenty, and even forty-eight hours after the demise of the parents, and the children extracted alive; but a due degree of caution is to be exercised before accepting these cases as proved; in most of them, it is quite probable that a state of syncope was mistaken for death. It is important, for the assured safety of the child, that no time be lost in its extraction after the death of the mother. There is, among others, one example recorded which, I believe, stands uncontradicted, and has received the very general assent of the profession. I allude to the extraordinary case of the Princess of Schwartzberg, whose death occurred in Paris in 1810 under the most painful circumstances. She was one of the gay party participating in the pleasures of a ball given by her brother-in-law, the Austrian ambassador. During that night of festivity there was an appalling conflagration which, together with other victims, caused the death of the princess, who was far advanced in gestation. On the day succeeding her death, a living child was removed by the Cæsarean operation. This case, however, although well authenticated, while it proves the possibility of the fœtus *in utero* surviving its mother for several hours, should be regarded as a very rare exception to the general rule; for it is conceded that, as a principle, the child dies either before, shortly after, or simultaneously with its parent. Yet, notwithstanding this general fact, it is abundantly shown that numerous children have been saved by the *post-mortem* Cæsarean section.

It is an interesting circumstance that one of the earliest legislative acts among the Romans provided that no pregnant woman should be admitted to sepulture until her child had been removed by this operation: *Negat lex regia mulierem quæ pregnantis mortua sit, humari antequam partus ei excidatur; qui contra fecerit, spem animantis cum gravida peremisse videtur.* In recognition of the propriety of this ancient law, and with the view of carrying it out practically in the sense in which it was no doubt originally intended,

the Senate of Venice, in 1608, proclaimed the imposition of severe penalties upon every medical man, who should attempt this operation on a woman supposed to be dead, without exercising as much caution as if she were alive.* History mentions more than one instance in which an incision had been made into the abdomen for the purpose of extracting a child from its supposed dead parent, when it was subsequently shown that she was still living! Hence, in all cases of *post-mortem* Cæsarean operation, it is the first duty of the surgeon to be morally certain that the life of the mother is extinct; and, in order to avoid all error, to keep constantly in mind the sensible and conservative enactment of the Venetian Senate, to which allusion has just been made.

Peu (1694) had the honesty to record a thrilling case, which occurred to him, and about which, therefore, there can exist no doubt. He says, in the early part of his practice he was requested to attend a young primipara in her accouchement; on his arrival at the house, the friends of the patient informed him that she had just expired, and so he thought himself; he proceeded at once to extract the child by the Cæsarean section, but the instant he commenced his incision *the woman gave a shudder, accompanied with grinding of the teeth, and a movement of the lips—un tressaillement accompagné de grincement des dents et de remuement des lèvres!*†

How the Operation should be Performed.‡—I have already said, with unequivocal emphasis, that one of the essential elements of success in the Cæsarean section is *to commence the operation early, before the patient has become exhausted, and her system fretted by ill-advised interference on the part of her medical attendant; and I now state without qualification*—that it is the duty of the accoucheur to ascertain at an early period of the labor whether the circumstances of the case are such, in his sound judgment aided by experienced counsel, as to justify a resort to this expedient. The moment the question is decided affirmatively, further delay is not only unnecessary, but fraught with danger. Supposing, therefore, that this material point has been duly determined, the next question arises—Should the patient be made acquainted with the nature of the operation? Here, again, I may perchance differ with my professional brethren; but I am clearly of opinion that it is infinitely better, so far as the result is concerned, that the mother should be kept in partial ignorance; tell her, for example, that it has become necessary for the safety of her child and the termination of the

* The King of Sicily (1749) passed the sentence of death on the physician, who failed to perform the Cæsarean section on a female dying in the latter months of gestation.

† *La Pratique des Accouchemens*, p. 334.

‡ Prof. Fordyce Barker reports an interesting case of Cæsarean section in the *American Medical Times*, Jan. 26th, 1861.

labor, that you should interpose and assist nature, but sedulously keep from her the fact that you are about to *lay open her abdomen and womb for the purpose of extracting the infant*. Such a revelation, common sense tells us, would be received by the suffering woman with terror, acting injuriously on her nervous system, and thus, to an extent at least, presenting a barrier to recovery. But how, you may ask, can the operation be performed without the knowledge of the patient? The answer to this question brings me to a most important point, and it is this—*place her under the influence of anæsthesia, hush her into unconsciousness, and make her blissful in her ignorance*.

These preludes having been decided upon, care should be taken to empty the bladder; the patient should be on her back, with the lower limbs slightly flexed; at least two assistants will be needed, well supplied with soft, delicate sponges. Things being thus prepared, the question presents itself—In what way is the incision to be made? One author recommends the oblique, another the transverse, while a third urges a vertical opening through the *linea alba*. Each of these, it is contended, has its advantages and disadvantages. The vertical incision through the *linea alba* is most commonly resorted to, and this I shall describe. In selecting this point for the opening into the abdominal cavity, there is no fear of wounding the epigastric artery, nor is there any division of muscular fibre, and there is much less hazard of involving the intestines, than in either the oblique or transverse incision. Again: the uterus is opened in the central portion of its long axis, and in a direction parallel to its muscular tissue. On the other hand, the section through the *linea alba* is objected to by some, because, it is alleged there will be danger of injuring the bladder; and, also, as the tissues embraced in the opening are exclusively fibrous, the healing or cicatrization of the abdominal incision will necessarily be more or less tardy. These objections are not of much moment, for the bladder can be amply protected by evacuating its contents, and the comparative tardiness of the cicatrization is of very little consequence.

The surgeon, placed on the right of the patient, with his two assistants on the opposite side, makes with a convex bistoury his incision from six to seven inches in length, commencing at the umbilicus and passing toward the pubes. This first incision will lay open the abdominal cavity, which, of course, will expose to view the peritoneal covering; this membrane should be cautiously incised below, so that the index finger may be introduced; a probe-pointed bistoury is then carried along the finger for the purpose of incising the peritoneum* to an extent corresponding with the

* In order to avoid the incision of the peritoneum, Jorg in 1806, and Ritgen in 1820, proposed an operation which should lay open the vagina, instead of the anterior plane of the uterus. More recently this suggestion has been carried out in

external opening; great caution is to be exercised by the assistants as soon as the abdominal cavity is laid bare in steadying the uterus, and preventing the protrusion of the intestines; if this protrusion should occur, the intestines are to be gently compressed and replaced by delicate warm sponges. The peritoneum being divided, the next stage is the incision of the uterus itself. This must be done discreetly, not by one abrupt stroke of the knife, but gradually, so that when the cavity of the organ is exposed, the membranous sac, if it should have preserved its integrity, may not be too suddenly opened, or the fœtus involved in the incision.* It is recommended to carry the incision into the uterus as high up as possible, so that the inferior point of the opening may not be as low down as the opening made into the abdomen.

This precaution will, after the organ has contracted, prevent the escape of the lochial discharge into the abdominal cavity. It may possibly occur that the placenta will be so situated as to be included in the incision made into the uterine wall—it would be a rare circumstance, however, for this mass is seldom found attached to the anterior plane of the organ—if so, do not become alarmed, but proceed at once to extract the fœtus, as if the accident had not

Paris by A. Baudelocque, Jr.; the operation is called *elytrotomy*, and is performed as follows: The incision commencing near the spine of the pubes is extended, parallel with Poupart's ligament, to the anterior superior spinous process of the ilium. Carefully avoiding the epigastric artery, the abdominal parietes are divided; the peritoneum is then not incised, but pushed away from the iliac fossa into the excavation; the upper portion of the vagina is thus exposed, and a free incision being made into it, the index finger is introduced into the opening for the purpose of bringing the *os uteri* fully in the direction of the wound made in the abdomen; this transposition may be facilitated by pressing with the other hand the fundus of the organ backward. The *os uteri* being brought in correspondence with the opening made in the abdomen, the delivery is to be committed to nature, and the child expelled by the force of uterine contraction. Plausible as this operation may appear—to me it is the very reverse—it failed completely in the hands of Baudelocque, and I am not aware that it has ever succeeded.

* There exists a difference of opinion as to whether the Cæsarean section should be performed *before* or *after* the escape of the liquor amnii. If the amniotic fluid have not escaped, there will certainly be less danger of injuring the child with the knife, for the fluid will, to a certain extent, interpose between the surface of the fœtus and the walls of the uterus: on the contrary, should the membranous sac be entire, there will be the danger, as soon as it is penetrated, of the fluid escaping into the peritoneal cavity. My own opinion is, that it is preferable to operate before the rupture of the sac; and as soon as the womb is laid open, I should advise, if possible, the introduction of a catheter into the *os uteri* for the purpose of rupturing the membranes, and thus affording an escape to the fluid through this orifice. If this cannot be accomplished, then it would be good practice to puncture the sac below the incision made into the uterus, and in this way the fluid would find its exit through the mouth of the organ, which would prevent the possibility of its passing into the peritoneal cavity. The assistants should, at all events, be on the alert, and, in the contingency of the sudden penetration of the sac by the bistoury, be prepared with sponges to prevent the flowing of the amniotic liquor into the abdomen.

occurred—in the following manner: Should the head be near the opening, seize it gently by placing the index-fingers below the inferior maxillary bones, and employ proper extractive force; if, on the contrary, the breech be there, withdraw it first; if any other surface of the fœtus present at the opening, introduce the hand very gently, and seize the feet, and thus deliver the child. As soon as the child is extracted, if it be alive, a ligature is to be applied to the cord, and then separated from its mother.

What about the placenta? It is recommended by some authors to proceed at once, the moment the child is in the world, to remove the after-birth. In the event of complete detachment of the placenta or hemorrhage in consequence of partial detachment of this body and inertia of the uterus, there cannot be two opinions as to the propriety of the practice; but in the absence of these contingencies, the rule I hold to be a bad one, and more or less perilous to the mother. Therefore, my advice to you is this—let nature do the work of separation, if she is not too long in performing it; and the moment the detachment has been accomplished, which may be ascertained by slight tractions on the cord, then the mass is to be brought away, care being observed to remove with it the membranes, for if they be permitted to remain in the uterus, their presence will result in more or less irritation and distress to the patient. Be careful, also, after the withdrawal of the after-birth, to remove any coagula of blood from the uterine cavity.

But suppose nature does not promptly detach the placenta, how long would it be judicious for the accoucheur to delay interference? If in five or ten minutes after the extraction of the child the placenta should not have become separated, it would, I think, be imprudent to wait longer; the accoucheur should then introduce his hand through the incision, and cause the artificial detachment in the manner described in a previous lecture. If the extraction of the after-birth be followed by inertia of the womb—a circumstance quite unlikely to occur—a small piece of ice momentarily applied to the lips of the opening will generally suffice to awaken tonic contractions of the organ.

Dressing the Wound.—One of the advantages of the operation by the vertical incision is, that there are no vessels exposed, and hence no hemorrhage; however, in cutting into the uterus itself, some of the uterine arteries may be involved, but the bleeding can be readily stayed by the assistants making pressure on the orifices with the finger; soon after the extraction of the after-birth, the wound contracts, the incision made into its wall is reduced to one or two inches, and in this way all hemorrhage is arrested. For the purpose of closing the wound in the abdomen, the interrupted or twisted suture is usually employed; adhesive strips should be placed in the intervals of the suture, and care taken to leave the

lower extremity of the wound open to afford escape to matter, etc. Nothing, of course, is done with the incision made into the uterus, for it unites speedily through the process of nature.* As soon as the external wound has been closed by means of suture, the whole should be covered with a piece of linen spread with simple cerate; over this should be placed a compress supported by a circular bandage. It would be well, as a general rule, after the dressing has been completed, to administer a composing draught for the purpose of quieting the system, and inducing sleep. The rest of the treatment is to be conducted on general principles, in accordance with the development of circumstances.†

Since the publication of the second edition of this volume, I have read with much pleasure an excellent essay on the "Statistics of the Cæsarean Operation," by M. Philan-Dufeillay,‡ and it affords me no little satisfaction to find that his views are entirely coincident with my own.§ This author remarks, that "the method usually followed of simply comparing the deaths with the recoveries after the operation, must lead to false deductions. In numerous cases, the deaths cannot be ascribed to the operation, but to antecedent conditions of the patient; which, in many instances, may be controlled." He presents a table of 88 cases, collected since 1845, in which the cæsarean section has been performed; "of these, 50 recovered; of the remaining 38, the causes of death were, in six, some antecedent disease; two died of puerperal fever, the operations having been performed in hospitals. In the 30 remaining cases, the deaths must be imputed, in part, at least, to the unsuccessful attempts made to deliver by the natural passages." M. Philan-Dufeillay then speaks of the influence of the duration of labor over the result: "In 29 successful cases, the natural powers were preserved in 24; in 20, the duration of the labor was under 24 hours; in 19 fatal cases, the forces were failing or exhausted in 18; and in 11 cases, the labor continued beyond 24 hours." He concludes that the cæsarean operation, performed under favorable conditions, gives nearly 75 per cent. of recoveries.

* Although, as a general rule, it is true that the lips of the wound into the uterus do become united through the contractions of the organ, yet this is not always the case.

† It may not be out of place, as connected with the current literature of the question, to observe that it has recently been proposed by Dr. Cristoforis to substitute for the Cæsarean section and symphyseotomy what he terms the *resectio subperiosteæ* of the pubic bones, including the horizontal and descending rami. He suggests first to enucleate the bones from their periosteal covering, in the hope that it will subsequently be filled by osseous deposits. He records four experiments on dogs, in which this deposit of bony matter followed the enucleation. [Ann. Univ. 1858.

‡ Arch. Gén. de Méd., 1861.

§ See page 632 of this volume.

LECTURE XLII.

Vaginal Cæsarean Operation, or Vaginal-Hysterotomy—Indications for this Operation—Two Cases in Illustration by the Author—Embryotomy—Meaning of the Term—Amount of Pelvic Contraction justifying Embryotomy—Dangers and Fatality of the Operation—Difference of Opinion among Authors as to the Circumstances indicating Embryotomy—The Case of Elizabeth Sherwood, as reported by Dr. Osborn—The Dangerous Precedent growing out of that Case—Evidences of the Child's Death in Utero—What are these Evidences?—Conflict of Sentiment among Writers on this Question—Great Caution necessary in forming a Judgment—Analysis of the Evidence—Too General Use of the Perforator and Crotchet—Melancholy Results of this Fondness for Embryotomy—Case in Illustration—Mode of Performing the Operation of Embryotomy—In Hydrocephalus, what is to be done?—Decollation—When to be resorted to—Evisceration—When indicated—Cephalotripsy—Meaning of the Term—When to be employed.

GENTLEMEN—Having disposed of the subject of the *abdominal Cæsarean section*, it is now proper that I should describe to you the *vaginal Cæsarean operation*, sometimes called *vaginal-hysterotomy*. This operation may be necessary without any deformity of the pelvis, or any disproportion between it and the fœtus, occasioned by an increased size of the latter. The usual causes indicating the necessity for the operation are traceable to some peculiar condition of the mouth of the uterus—for example, occlusion of the *os uteri* at the time of labor, or a hard, unyielding state of it, from scirrhus development, or a fibro-cartilaginous change. Again: it may sometimes happen that the cervix of the organ is so completely malposed, either retro-verted or ante-verted, that it cannot be brought to its normal situation by the best directed manipulations of the accoucheur. Under any of these circumstances, the whole force of the parturient effort is lost; there is no response to the contractions of the uterus, and the danger necessarily becomes complicated, involving the safety of the mother from rupture of the organ, the intervention of convulsions, or positive exhaustion of her vital forces; the destruction of the child will also be hazarded from long-continued and undue pressure. It is, therefore, when the labor is obstructed by one or other of these several conditions, manifestly a question for the sound judgment of the accoucheur as to the *time* of resorting to an operation for the relief of parent and child—I repeat the terms parent and child, for it will be his duty, in cases like these, to proceed to artificial delivery the moment he is assured that nature is unable to overcome the obstacle, and not tarry until the mother is on the

borders of death from exhaustion, or the child sacrificed by protracted compression. I here reiterate what I have previously stated: *interference should be opportune, so that in its exercise the maximum of good may be accomplished—the saving of the lives of both mother and child.*

I have had the good fortune to perform the *vaginal Cæsarean operation* twice, and with the most satisfactory results. These cases are of more than ordinary interest in several particulars; in the hope that they may prove instructive, and with a demand on your kind indulgence, I shall present them to you in detail as originally published.*

December 19, 1843, Drs. Vermeule and Holden requested me to meet them in consultation, in the case of Mrs. M., who had been in labor for twenty-four hours. On arriving at the house, I learned the following particulars from the medical gentlemen: Mrs. M. was the mother of two children, and had been suffering severely, for the last fourteen hours, from strong expulsive pains, which, however, had not caused the slightest progress in the delivery. She was taken in labor Monday, December 18, at seven o'clock P.M., and on Tuesday, at seven P.M., I first saw her. Her pains were then almost constant; and such had been the severity of her suffering, that her cries for relief, as her medical attendants informed me, had attracted crowds of persons about the door. As soon as I entered her room, she exclaimed, "For God's sake, doctor, cut me open, or I shall die; I never can be delivered without you cut me open." I was much struck with this language, especially as I had already been informed that she had previously borne two living children. At the request of the medical gentlemen, I proceeded to make an examination per vaginam, and must confess that I was startled at what I discovered, expecting every instant, from the intensity of the contractions of the uterus, that this organ would be ruptured in some portion of its extent. I could distinctly feel a solid, resisting tumor at the superior strait, through the walls of the uterus; *but I could detect no os tinæ.* In carrying my finger upward and backward toward the cul-de-sac of the vagina, I could trace two bridles, extending from this portion of the vagina to a point of the uterus, which was quite rough and slightly elevated; the roughness was transverse in shape, but with all the caution and nicety of manipulation I could bring to bear, I found it impossible to detect any opening in the womb. In passing my finger with great care from the bridles to the rough surface, and exploring the condition of the parts, with an anxious desire to afford the distressed patient prompt and effectual relief, I distinctly felt cicatrices, of which this rough surface was one.

* New York Journal of Medicine. March, 1843.

Here, then, was a condition of things produced by injury done to the soft parts at some previous period, resulting in the formation of cicatrices and bridges, and likewise in *the closure of the mouth of the womb*. At this stage of the examination, I knew nothing of the previous history of the patient more than I have already stated, and the first question I addressed to her was this: Have you ever had any difficulty in your previous confinements? Have you ever been delivered with instruments? She distinctly replied that her previous labors had been of short duration, and that she had never been delivered with instruments, nor had she sustained any injury in consequence of her confinements. Dr. Vermeule informed me that this was literally true, for he had attended her on those occasions. This information somewhat puzzled me, for it was not in keeping with what any one might have conjectured, taking into view her actual condition, which was undoubtedly *the result of direct injury done to the parts*.

I then suggested to Drs. Vermeule and Holden the propriety of questioning the patient still more closely, with the hope of eliciting something satisfactory as to the cause of her present difficulty; remarking, at the same time, that it would be absolutely necessary to have recourse to an operation for the purpose of delivering her. On assuring her that she was in a most perilous situation, and, at the same time, promising to do all in our power to relieve her, she voluntarily made the following confession: About six weeks after becoming pregnant, she called on the notorious Madame Restell, who, learning her situation, gave her some powders with directions for use; these powders, it appears, did not produce the desired effect. She returned again to this woman, and asked her if there were no other way to make her miscarry. "Yes," says Madame Restell, "*I can probe you; but I must have my price for this operation.*" "What do you probe with?" "*A piece of whalebone.*" "Well," observed the patient, "I cannot afford to pay your price, and I will probe myself." She returned home, and used the whalebone several times; it produced considerable pain, followed by discharge of blood. The whole secret was now disclosed. Injuries inflicted on the mouth of the uterus by these violent attempts had resulted in the circumstances detailed above. It was evident, from the nature of this poor woman's sufferings and the expulsive character of her pains, that prompt artificial delivery was indicated.

As the result of the case was doubtful, it was important to have the concurrent testimony of other medical gentlemen, and as it embodied great professional interest, I requested my friends, Dr. Detmold, and the late Drs. Washington and Doane, to see it. They reached the house without delay, and after examining minutely into all the facts, it was agreed that a bilateral section of

the mouth of the womb should be made. Accordingly, without loss of time, I performed the operation in the following manner: The patient was brought to the edge of the bed, and placed on her back. The index finger of my left hand was introduced into the vagina as far as the roughness, which I supposed to be the original seat of the *os tincæ*; then a probe-pointed bistoury, the blade of which had been previously covered with a band of linen to within about four lines of its extremity, was carried along my finger until the point reached the rough surface. I succeeded in introducing the point of the instrument into the centre of this surface, and then made an incision of the left lateral portion of the *os*, and, before withdrawing the bistoury, I made the same kind of incision on the right side. I then withdrew the instrument, and in about five minutes it was evident that the head of the child made progress; the mouth of the womb dilated almost immediately, and the contractions were of the most expulsive character. There seemed, however, to be some ground for apprehension that the mouth of the uterus would not yield with sufficient readiness, and I made an incision of the posterior lip through its centre, extending the incision to within a line of the peritoneal cavity. In ten minutes from this time, Mrs. M. was delivered of a strong, full-grown child, whose boisterous cries were heard with astonishment by the mother, and with sincere gratification by her medical friends. The expression of that woman's gratitude, in thus being preserved from what she and her friends supposed to be inevitable death, was an ample compensation for the anxiety experienced by those, who were the humble instruments of affording her relief. This patient recovered rapidly, and did not, during the whole of her convalescence, present one unpleasant symptom. It is now ten weeks since the operation, and she and her infant are in the enjoyment of excellent health.

I omitted to mention that the urethra was preternaturally dilated. I introduced my finger as far as the bladder without any consciousness on the part of the patient, such was the degree of its enlargement.

About ten days after the operation, the late Dr. Forry visited the patient with me, and heard from her own lips the narrative of her case, so far as her visit to Madame Restell is concerned, and which I have already stated. On Saturday, January 20, Dr. Forry again accompanied me on a visit, and a vaginal examination was made. The mouth of the womb was open, and permitted the introduction of the end of the forefinger; the two bridles were distinctly felt, extending from the upper and posterior portion of the vagina to the posterior lip of the *os tincæ*, which they seemed firmly to grasp.

In a professional point of view, this case is not without interest. It is evident that, without the operation, the patient must have

sunk. She had been in labor precisely twenty-nine hours when I made the section of her womb, and for twenty hours previously the contractions were most energetic, possessing all the characteristics of true expulsive pains. But yet, with all this suffering, not the slightest change had been effected in the parts. If nature, therefore, had been competent to overcome the resistance, sufficient time was allowed for this purpose. Longer delay would undoubtedly have placed the lives of both mother and child in extreme peril; for, from the reiterated but unavailing efforts of the womb, there was reason to anticipate rupture of this viscus, which would most probably have compromised the life of the mother; while, at the same time, the child was exposed to congestion from constant pressure by the contractile force of the uterus.

The second case is as follows: * On Saturday, November 6, 1847, at 6 A.M., Dr. Alexander Clinton was summoned to attend Mrs. L., aged thirty-six years, in labor with her first child. Dr. C. had been for some time the family physician of Mrs. L., and had attended her in repeated and severe attacks of nephritis. On arriving at the house he found Mrs. L. in labor, the pains being decided, and occurring with regularity at intervals of fifteen and twenty minutes. In his examination per vaginam, the doctor was unable to detect the os tincæ; he very cautiously explored the vagina and presenting portion of the womb with his finger, and, after several fruitless attempts to find the mouth of the uterus, he came to the conclusion that the difficulty of reaching the os was owing to malposition of the organ, probably retroversion of the cervix. Accordingly, he waited until evening, when the pains increasing in violence, and assuming an expulsive character, he examined his patient, but without better success. He then proposed a consultation, the patient having been in labor fourteen hours. My colleague, Professor Mott, was sent for. On hearing the particulars of the case, he made a vaginal examination, and, after repeated attempts, failed in finding the mouth of the womb. Professor M. suggested that possibly some change might occur during the night in the position of the parts, which would enable him to reach the os uteri, and left the house with the promise that he would return in the morning. Dr. Clinton continued with his patient during the night, and the pains recurred regularly with more or less force. He made several examinations in the night, but could feel nothing except a globular surface.

In the morning, Nov. 7, at ten o'clock, Professor Mott returned. The pains were then much more violent, and the patient suffered severely. He again attempted by examination to reach the mouth of the womb, and again failed. To use his own language, "I have

* American Journal of Medical Sciences. 1847.

seen a great many obstetric cases, and have attended almost every variety of parturition, but it is the first time, after thirty-six hours' labor, that I could not feel the *os tincæ*." The case was now assuming a dangerous phase; the pains were frequent and expulsive, with an obliterated mouth of the uterus. The fear, therefore, was rupture of this organ, and death of the patient, with but little chance for the life of the child. The husband and friends were informed of the precarious situation of the patient. Drs. Mott and Clinton decided to have additional consultation, and at the request of these gentlemen I met them at one o'clock on Sunday, the patient having been in more or less active labor for forty hours.

On examining her I could not feel the slightest trace of the *os tincæ*, and I became satisfied, after a thorough exploration, that it was entirely obliterated. Under these circumstances, the death of the mother being inevitable without an operation, it was proposed to lay the womb open through the vagina, and at the request of the gentlemen, I proceeded to perform the operation as follows: With a probe-pointed bistoury covered to within a few lines of its extremity with linen, and taking my finger as a guide, I made a bilateral section of the neck of the womb, extending the incision to within a line or two of the peritoneal cavity. The head of the child was immediately felt through the opening. The pains continued with violence, but there was no progress in the delivery; the neck of the uterus was extremely hard and resisting, and presented to the touch, after the incision, a cartilaginous feel. Dr. Mott and myself then left the patient in charge of Dr. Clinton, and returned again at six in the evening. At this time, although the pains had been severe, the head had not descended, nor had any impression been made on the opening. I then made an incision through the posterior lip; the patient was not in a condition to sustain bloodletting, and a weak solution of tartar-emetic was administered with a view, if possible, of producing relaxation. Dr. Clinton remained with his patient, and promised, if anything occurred during the night, to inform us of it.

We were both sent for at two o'clock. Dr. Mott having arrived before me, and finding the patient suffering severely from violent and expulsive pains, all of which produced little or no change in the position of the child's head, enlarged the incision which I had previously made in the posterior lip of the cervix. We remained until seven o'clock in the morning, when we left. The patient being much fatigued, a Dover's powder was ordered, which procured a comfortable sleep, and temporary immunity from suffering.

We called again at eleven o'clock. The opening had somewhat dilated, and the head could be more distinctly felt, but it had not begun to engage in the pelvis. There was much heat about the parts, and the scalp was corrugated. The pains continued with

regularity, losing nothing in violence, and at six o'clock in the evening of Monday the patient's strength, which had been cautiously guarded, was evidently giving way, and her pulse rose to one hundred and forty! In a word, the symptoms were most alarming. The question now presented itself—What was to be done? After mature deliberation, being essentially conservative in the whole management of the case, we determined to make an attempt to deliver with the forceps, certainly not an easy thing to do with the head of the fœtus at the superior strait, not having begun to engage in the pelvis, and the mouth of the womb rigid and unyielding. The forceps, however, after a full view of all the circumstances, presented to us the most feasible means of effecting delivery.

At the request of Drs. Mott and Clinton, I applied the instrument, and was fortunate enough, without much loss of time, in locking it. The head was situated diagonally at the upper strait, with flexion but partially made. At first, I directed my traction downward and backward, the handle of the forceps forming an acute angle with the axis of the inferior strait of the pelvis; and when I succeeded in flexing the chin of the child upon the sternum, I then rotated the handle of the instrument for the purpose of giving the demi-spiral movement to the head. In this way, after very great effort, I succeeded in bringing the head to the inferior strait, and with powerful, but well-guided tractions, drew it more than one half into the world. At this stage of the operation, my arms and hands were nearly paralysed, such was the force necessary to overcome the difficulty. I requested Dr. Mott, who was by my side, to relieve me, and after no inconsiderable effort he succeeded in bringing the head into the world; our gratification was in no way diminished by the fact that the child was alive, an event certainly not to be expected.

As strange as it may appear, the only inconvenience experienced by the mother after delivery was an inability to pass her water; this continued for about two weeks, rendering it necessary to introduce the catheter twice daily for the purpose of emptying the bladder. The mother and child are in the enjoyment of excellent health.

It may, perhaps, be thought by some that the patient should have been delivered sooner, and that we subjected her to serious and unnecessary hazard in delaying delivery by forceps. This reasoning might possibly be sustained on general principles; but I think it will be conceded that, in this individual case, we were not only justified in the delay, but the result proved the wisdom of the course we pursued. In my opinion, nothing, under the peculiar circumstances of the case, could have warranted an attempt at artificial delivery, *save an approach to exhaustion on the part of the mother,*

or the occurrence of some accident placing life in imminent peril

The position of the fœtal head, and the condition of the mouth of the womb, were such as to render extremely probable the failure of any attempt at delivery. The obvious indication, therefore, was to trust to nature as long as she was capable of acting, and for the accoucheur to proceed to artificial delivery the moment the general system exhibited unequivocal evidence of prostration.

It may be asked whether this was primary or secondary closure of the *os tincæ*. That it was secondary is manifest from two circumstances: 1. The patient always menstruated regularly previous to her pregnancy; and secondly, to suppose that she could have become impregnated with an imperforate *os tincæ*, is to suppose what, under the circumstances, may be called an absurdity. There are cases, however, recorded in which sexual intercourse was had through the female urethra, followed by impregnation, but in these examples there was a communication between the bladder and uterus. In the present instance, there existed no such communication. The only rational explanation of the closure of the womb in this patient is, that it was the result of inflammation of the *os uteri*.

Embryotomy.—The term embryotomy means literally the cutting up of the child for the purpose of diminishing its bulk, so that it may be brought away in fragments. It may be of two kinds: 1. Where it becomes necessary simply to lessen the volume of the head, either by affording an outlet to the brain (cephalotomy), or removing the bones of the cranium piecemeal (craniotomy), or by means of the cephalotribe—an instrument of which we shall speak presently—crushing the head; 2. Where it is essential to extract the entire child in portions, thus involving more or less the section of the whole fœtal mass.

It can scarcely be necessary for me to remind you that the only justification which can be alleged for this operation, is such a disproportion between the maternal organs and fœtus as to render it physically impossible that the latter can be made to pass, either through the natural effort, by the aid of the forceps, or version, supposing, of course, the woman to have arrived at the full period of her gestation. I have already remarked that it is not safe, so far as the mother is concerned, to attempt the extraction of a child by *embryotomy* if the antero-posterior diameter be less than from 2 to $2\frac{1}{2}$ inches, unless, perhaps, in case of the child being dead, and more or less advanced in decomposition. Again: you have been told, that, as a general principle, although there are some exceptional instances, a living child cannot be delivered with a pelvic diameter under $3\frac{1}{2}$ inches. If this be so—and I am quite confident that I am strictly within the record—the question arises, if the child be alive, and the diameter should even measure $2\frac{1}{2}$ inches, or if it should

be more than $2\frac{1}{2}$ but less than $3\frac{1}{8}$,* what is the course to be pursued?

My own principle of action, under these circumstances, would be a preference for the Cæsarean section over the mutilation of the child, and for the reasons detailed in the previous lecture; and, moreover, if I be correct in my argument in that lecture, an early resort to the Cæsarean section with the aid of anæsthesia would so far diminish its dangers in contrast with embryotomy, as absolutely to render it, of the two expedients, but little more fatal to the mother, while, instead of the necessary destruction of all the children, a very large portion of them would be saved; for you are not to forget that, under the most unfavorable circumstances, only 1 in every $3\frac{1}{4}$ of the children is lost in the Cæsarean operation. If, however, it be ascertained that the child is dead, then the circumstances of the case entirely change; for the cardinal argument, I contend, in favor of the Cæsarean operation is to prevent the horrid destruction of fetal existence, while at the same time the danger to the mother is but slightly enhanced. So that the child being dead, with a diameter even less than two inches, I should unquestionably have recourse to embryotomy; for it would be only under the most desperate circumstances, that, knowing the child to be sacrificed, the Cæsarean operation could be selected as an alternative; and yet I must confess that if the antero-posterior diameter did not measure $1\frac{1}{2}$ inches, the Cæsarean section would present, in my judgment, a better chance to the mother than embryotomy.

You see, therefore, that if the antero-posterior diameter should not afford a space of one and one half inches—even admitting the

* It would be proper if the diameter were three and one-eighth inches, or even slightly under, to attempt delivery by the forceps, for it is barely possible that success might attend the effort. Should it, however, fail, as I am sure it would in the vast majority of cases, put the instrument aside, and have recourse (the child being alive) to the Cæsarean section.

† The celebrated case of Elizabeth Sherwood, so repeatedly referred to by writers on midwifery, has, I am confident, been productive of bad practice, and I am disposed to think that, more especially in Great Britain, it has been regarded as ample authority for a resort to the perforator. So impressed am I with this conviction, and anxious as I am that the true facts of the case shall be properly appreciated, I do not consider an apology necessary for quoting it *in extenso*, as originally published by Dr. William Osborn, in whose practice the case occurred:

"Elizabeth Sherwood was forty-two inches in height, and so deformed as never to be able to stand erect for one minute without a crutch under each arm. At the age of twenty-seven years she became with child. Early on Sunday morning, November 19, 1776, she complained of *having been in pain the two preceding days and nights*. I examined her *per vaginam* that evening with great attention. On the introduction of the finger, I perceived a tumor, equal in size, and not very unlike in the feel, to a child's head. It was, however, instantly discovered that this tumor was formed by the basis of the os sacrum, and last lumbar vertebra, which, projecting into the cavity of the pelvis at the brim, *barely left room for one finger to pass between it and the symphysis pubis, so that the space from bone to bone at that part, could not*

child to be dead—embryotomy is not to be resorted to, but the alternative is the Cæsarean operation. If, on the contrary, this diameter should yield slightly over one and one half inches, then, with all the risk incurred by the mother from the operation, with a

exceed three quarters of an inch. On the left side of the projection, quite to the ileum, which was about two inches and a half in length, the space was certainly not wider, and by some, who examined her afterward, it was thought to be narrower. On the right side, the aperture was rather more than two inches in length from the protuberance to the ileum, and as it admitted the points of three fingers (lying over each other) in the widest part, *it might at the utmost be about one inch and three quarters from the hind to the fore-part; but it became gradually narrower, both toward the ileum and toward the projection.*

"The membranes were not yet broken, but with some difficulty I felt the child's head through them, situated very high above the projection. The abdomen was *hard and tender*; as she seemed *much fatigued* for want of rest, fifteen drops of tinct. opii were given, by which some sleep was procured between the pains. The membranes broke some time after I left her, and there was the usual quantity of liquor amnii. The next morning, being hot and thirsty, and her pulse very quick, ten ounces of blood were taken from her arm; and the bandage accidentally slipping off soon after her arm was tied up, she might perhaps lose as much more before it was discovered. No alteration whatever had taken place either in the os uteri, which was still but little dilated, though soft and flabby, or in the position of the child's head. In so extraordinary and singular a case, I naturally wished for the advice and assistance of my professional friends. I met in consultation that evening Drs. Bromfield, Denman, Walker, and Mr. Watson. Every gentleman present immediately satisfied himself by examination per vaginam, of the dimensions of the pelvis, *some thinking it rather narrower, but none wider than the dimensions stated above.* *We weighed, with great deliberation, every circumstance by which our future conduct in this case ought to be regulated; particularly we used our best endeavors to determine the state of the child in utero; and whether, if the Cæsarean operation should be performed, which we had in contemplation to do for some time, there would be a certainty of preserving one life at least. We were rather disposed to believe that the child was dead.* It was, therefore, agreed that an attempt at least, ought to be made to deliver the poor creature, by opening the child's head, and extracting it with the crotchet.

"I commenced the operation about eleven o'clock that night. Even the *first part of the operation was attended with considerable difficulty and some danger.* The os uteri was but little dilated, and awkwardly situated in the centre, and most contracted part of the brim. The child's head lay loose above the brim and scarce within reach of the finger. I desired an assistant to compress the abdomen with sufficient force to keep the head in contact with the brim of the pelvis, so as to prevent it receding from the scissors. I introduced them with the utmost caution through the os uteri; and after repeated trials, at length succeeded in fixing the point into the sagittal suture; I very soon, with great facility, penetrated the cavity of the head, and with a common spoon extracted a quantity of the brain; breaking down the parietal bones, made an opening sufficient for the free discharge of what remained. *In this state we left her; although fatigued with this part of the operation, no opiate was given, as I wished to have the full effect of the labor-pains.* In this expectation I was disappointed, for, notwithstanding she was prevented from sleeping all night by the frequency and violence of the pains, in the morning I was not sensible of the *smallest alteration in the position of the child's head.* During the whole day the pains were neither so strong nor so frequent as they had been; *her pulse was extremely quick, but tolerably strong; the discharge from the vagina was very considerable in quantity, and most abominably fetid.* Drs. Bromfield, Denman, and Hunter saw her in the course of the day; she

less space than two and one eighth inches, I should not hesitate to mutilate the child—being first satisfied of its death—for in this case, the compensating argument in favor of the Cæsarean section—the safety of the child—does not obtain.

was examined, besides, by more than thirty students in midwifery, which she willingly permitted at my request, from a representation of the singularity of her case and the utility which might result from its being more generally known.

"Toward the evening, the pains considerably increased, and as I wished to benefit from the full effect of them, no opiate was given; she, therefore, had no sleep; and the pains continued through the whole night. When I first saw her the next morning, her strength was greatly reduced; her pulse beat one hundred and forty strokes in a minute, notwithstanding every precaution had been used to guard against fever, particularly by forbidding all strong liquors, and by keeping the ward unusually cool. Her spirits, however, were good, and her resolution unabated. Upon examination, a small portion of the head was found squeezed into the pelvis.

"Our intention, by delaying the extraction of the child six and thirty hours after opening the head, was to allow the uterus opportunity to force the head as low and as much within reach of the crotchet as the nature of the case admitted; and afterward to induce as great a degree of putrefaction as possible in the child's body, by which means it would become soft and compressible, and afford the least possible resistance in its extraction. These two purposes appeared to me most completely accomplished, and there was no advantage from further delay. On the contrary, I was fearful that so large a mass of putrid matter as a child at full term, with placenta, etc., remaining in the uterus longer than was absolutely necessary, might expose her to the future danger of a putrid fever, if she should escape all material injury from the inevitable violence and consequent danger of the operation.

"I determined to begin to make an attempt to extract the child; I call it an attempt, for I was far from being satisfied in my own mind of its practicability. Adverting to the very small space of only 1½ inches at the utmost, and in the widest part, and that only on one side of the projecting sacrum, while the space between it and the symphysis on the other side barely amounted to three quarters of an inch, I trust I am justified in my feelings and expression.

"About 10 o'clock on Wednesday morning (the patient having been in labor since the previous Friday), I began the operation of extraction. The os uteri situated as before described, in the most contracted part of the brim, where the space was incapable of permitting the introduction of the curved point of the crotchet, without great difficulty and danger, I first endeavored to draw the os uteri with my finger into the widest part of the brim, and to dilate it as much as possible. Both these results were accomplished. I then introduced the crotchet through the perforation into the head, and by repeated efforts destroyed almost the whole of the parietal and frontal bones; as the bones became loose and detached, they were extracted with a small forceps, to prevent as much as possible the laceration of the vagina.

"The great bulk of the head, formed by the basis of the skull, still, however, remained above the brim of the pelvis, and it was impossible to enter without either diminishing the volume, or changing the position; the former was the obvious method, for it was a continuation of the same process, and I trusted would be equally easy in the execution. I was, however, most egregiously mistaken and disappointed, being repeatedly foiled in every endeavor to break the solid bones of the base of the cranium, the instrument, at first, invariably slipping. At last, however, by changing the position of the instrument, I fixed the point, I believe, into the great foramen, and by that means became master of the most powerful purchase that the nature of the case admitted. Of this I availed myself to the utmost extent, steadily increasing my force, till it arrived to that degree of violence which nothing could justify but the

The question of whether the child be alive or dead, is one of great significance, and is, in my judgment, with the reservations just stated, the turning point on which must rest the final decision—Cæsarean section or embryotomy. Therefore, it is right that we

extreme necessity of the case, and the absolute *inability*, in repeated trials, of succeeding by *gentler means*. But even *this force was to no purpose*, for I made *no impression* on that solid bone, nor had it in the least advanced by *all my exertions*.

"I became fearful of *renewing the same force in the same way*, and abandoned the first idea of breaking the bones of the cranium, and determined to try the second, of endeavoring to change the position. I *once more examined*, as *accurately* as the *mangled* state of the head would admit, *how* it presented. From the information thus procured, the *second method* appeared to me a *forlorn hope*; however, there was *no other resource*. I therefore again introduced the crotchet, fixed it in the great foramen, and got possession of my *former purchase*, and succeeded, together with the two fingers of my left hand, in changing the position of the head, and thus diminishing its volume. Continuing my *exertions* with the crotchet, I *soon perceived* the head to *advance* into the pelvis.

"Every *difficulty* was now *removed*, and, by a perseverance in the same means for a *short time*, the remaining part of the head was brought out of the os externum. After waiting a few minutes, a *napkin* was *put round the neck of the child*, and given to an *assistant*. I then introduced the crotchet, and, first opening the thorax, fixed it firmly in the sternum. By our *united force*, *strongly exerted* for about a *quarter of an hour*, the shoulders were brought down; and, *lastly*, *after opening the abdomen*, the whole body was extracted in the *most putrid and dissolved state*; but it appeared to be a *moderately sized child at full term*. The placenta came away without much trouble. The operation *continued* for about *three hours*; and the *poor creature*, although in *strong labor* three days, and her bodily strength *much exhausted* by violent and unavailing pains, yet she supported the *whole business* with *surprising fortitude*, and suffered much *less* than might *reasonably* have been expected either from the length of the labor or the *extreme violence* in the delivery. She went to sleep soon after the operation, passed a good night, complained of very little pain, etc.; she *recovered so fast*, that she *sat up the seventh day*, acknowledging, *with great gratitude*, that she was *then as well, in all respects*, as in any former period of her life.

"As far as I know, this woman's pelvis was the *smallest*, through which a *child at full time*, and of the *ordinary size*, however *lessened by art*, has *ever* been extracted; and it was in *contemplation* in this *very case*, to perform the *Cæsarean operation*, if we could have been *satisfied* of the *life* of the child, upon the *presumption* of the *impossibility* of bringing it, under the *circumstances of age and size*, through the *natural passages*. I *hope* the event of the case may *prove the means* of frequently *preventing* that *fatal operation* (the Cæsarean section) *in future*." [Essays on the Practice of Midwifery. By Wm. Osborn, p. 240-257.]

I think I have rendered a substantial service by the insertion of this case here; it is no garbled statement; on the contrary, it is in *ipsisimis verbis* of Dr. Osborn himself, just as it was distilled from his own pen. The underlinings are my own, and I intend them as a sort of commentary upon the details. Dr. Osborn, in his day, occupied no mean position; his opinion was one of weight in all matters pertinent to obstetric science; and hence the case of Elizabeth Sherwood, from the circumstance mainly of its having occurred in the practice of so distinguished a man, has not only become a part of history, but is regarded too frequently as an authority why embryotomy should be preferred to the Cæsarean section. But how different the influence of this case on the professional mind, if the unhappy woman had died

should examine the evidence, which may enable us to determine if the child *in utero* be living or not. Authors differ as to the nature and value of this evidence; some supposing that the question is one of easy decision, while others again, and certainly with good reason, regard it as a point, under certain circumstances, of much embarrassment.

Evidences of the Child's Death in Utero.—The following are enumerated as among the ordinary proofs that the child has ceased to live: 1. The discharge of meconium *per vaginam*; 2. A flaccid condition of the cranial bones, overlapping each other; 3. A want of elasticity in the scalp under the force of uterine contraction; 4. Cessation of fetal movements; 5. Failure to detect the pulsations of the fetal heart, or those of the umbilical cord; 6. Fetid discharges from the vagina, together with the passage of small detached pieces of epidermis from the presenting portions of the fetus.

Let us briefly consider the true import of these signs. Every practitioner of ordinary observation knows that the discharge of the meconium through the vagina of the mother is, *per se*, no evidence at all that the child is dead; for it may occur consistently with the life and full health of the fetus. In breech presentations, for example, it is one of the usual accompaniments of this form of birth; and I have known it to take place in an ordinary head presentation, and the child born alive.

The flaccidity of the cranial bones, together with their overlapping, is one of the uniform circumstances attending hydrocephalus; and hydrocephalus, although a deplorable complication, is no proof that the child does not live.

A want of elasticity in the scalp, under the force of uterine effort, needs a word of comment. As a general rule, when the labor is developed, and the head pressed more or less against the walls of the pelvis, there will be recognised corresponding with the orifice of the uterus an elastic tumor formed by the scalp of the child's head. This tumor is the result of the contractions of the uterus

under her accumulated sufferings! I now ask the reader to peruse every word of this statement with unbroken attention; and then I ask him whether, from the irresistible evidence furnished by the details of the statement, the fact of Elizabeth Sherwood having survived the operation is not a circumstance which would not be likely to occur once in ten thousand times; and whether her recovery is not fully entitled to be classed among the miraculous, hair-breadth escapes from death. Therefore, if this be so, it should be discarded from the books and the eulogiums of the lecture halls, as a guide for practice. It has exercised a singularly unhappy influence over the minds of some clever men; and has been, without due consideration, adopted as an evidence of the extreme deformity through which a child can be brought into the world by embryotomy, without compromising the safety of the mother. The only value of the evidence is, it proves simply what is universally admitted—that every rule has its exception.

together with the resistance encountered by the head in its descent. It is of no consequence, for it in no way involves the safety of the child. But in another aspect, it is of much interest. The tumor cannot form if the child be dead at the commencement of the labor, and if, after its formation, the fœtus should die, the tumor becomes soft and flaccid. Again: even when the child continues to live, the tumor will occasionally lose its elastic tension, in consequence of an extravasation of blood under the scalp, constituting a species of *cephal hæmatoma*, or bloody tumor, and this is apt to occur when the head of the child encounters an exaggerated pressure, either as the result simply of strong uterine force, or conjointly with a contraction of the pelvis. It may, also, happen that the child will be born alive and healthy without the slightest approach to the formation of the tumor.

As to the cessation of the fœtal movements, it is well known that some women never feel the child move during the whole period of pregnancy; others again, after having experienced the sensation for a certain period, fail to do so afterward, and yet bring forth living children.

The pulsations of the fœtal heart may or may not be detected; in the former instance, there can be no doubt that the child is alive; while in the latter, it does not necessarily follow that life is extinct.

Fœtid discharges from the vagina, together with the passage of small detached fragments of epidermis, indicating the decomposition of the fœtus, constitute very strong evidence that the child is dead; and yet there are cases recorded in which these phenomena have been recognised, and the child alive. Such instances, however, must be regarded as extremely rare exceptions to a very general rule. One of the most remarkable is that mentioned by Baudelocque* as having occurred in his own practice: He was called to a poor woman who had been in labor two days; there was emitted from the vagina an insupportable fœtor, commingled with fluids of the same character. The head of the child was at the upper strait, and the scalp soft and loose; the epidermis and hair fell off with the mere pressure of the finger; there had been no movement of the fœtus for the preceding twenty-four hours; the mother's pulse was feeble and quick; the tongue, gums, and lips were black, and she exhaled a cadaverous fœtor. These evidences—strong, indeed—of the child's death determined Baudelocque to resort to the crotchet; he held the instrument in his hand, but as he was about to introduce it, suddenly changed his mind, and decided to substitute for it the forceps, although convinced that the child was dead. It was a most happy substitution, as the

* *L'Art des Accouchemens*, vol. ii., p. 229.

sequel revealed, for he delivered the mother. The fœtid discharges, etc., were the result of the pressure on the summit of the head, which, however, was not increased by the thickness of the integuments.

So, you see, gentlemen, all these phenomena, in the composition of the fœtus, may ensue, and may be regarded as altogether exceptional, and out of the ordinary course.

The absence of pulsations in the cord may imply the death of the fœtus; for I have already mentioned the case of Dr. Arneth, of Vienna,* who mentions a case of immediate notice in which no pulsations had been felt an hour previous to delivery, and in each instance the child was living.

Procidencia of the cord, its coldness, and its state together *with its incipient putrefaction*, may be regarded as the very decided proofs that the child is dead.

The decision of this question is one of the most important, it, therefore, is the duty of the accoucheur to exercise the utmost care and discretion, in order that he may reach a correct conclusion. I am sure of discretion, in order that he may reach a correct conclusion, all, let him be cautious not to suffer himself to be misled by a conclusion from the mere love of bringing the child into the world piecemeal. Whether it be really a love for the child, or a love of indifference to the shedding of innocent blood, I cannot determine; but of one fact I am quite convinced, that the cold and crotchet are oftentimes employed in the service of recklessness altogether startling to those, who are not conversant with its share of influence in the doings of the accoucheur.

Culpable Indifference to Professional Duties.—Since I was visited by a young medical gentleman, in practice but a short period. In the course of his studies, the subject of operative midwifery was introduced, and he had enjoyed the best opportunities of learning the use of instruments, for his preceptor had been a practitioner of embryotomy on an average sixteen times a year. To gentlemen, such an announcement may appear extraordinary. I have myself witnessed in this city scenes which would satisfy my mind that it is not an exaggeration to say that I take the liberty of citing one case among several which I have in my memory, to show you that I do not exaggerate when I protest against the unholy acts of many of our accoucheurs, neither by Heaven nor education to assume the name of accoucheur in the parturient room.

The particulars of the following case I have already mentioned.

* See Lecture xxxi.

Translation of Chailly's Midwifery: "Two years since, I was requested to visit a poor woman who resided a few miles from this city; she had previously borne two living children, and her confinements had not been attended by any unusual circumstance. On arriving at the house, there was presented to my view a scene which I never can efface from memory. It was a spectacle at which the heart sickened; it was humiliating to my professional pride, and I could not but experience feelings of deep mortification. The unfortunate sufferer had been in labor 26 hours, when two medical gentlemen, for reasons which I trust were satisfactory to themselves and their consciences, decided to resort to the perforator. This instrument of death was accordingly thrust into the brain of a living child; the labor, however, did not advance, and they proceeded to remove the fœtus piecemeal. After four hours of desperate toil—and I ask where could have been their feelings of humanity—they succeeded in bringing away the entire fœtus in a mangled condition, with the exception of the head which was still in the womb. The friends of the poor creature—for, destitute as she was, she was not without friends in this her hour of tribulation—her friends, I repeat, became alarmed—their confidence was lost, and the serious apprehensions entertained for her safety, induced them to call in additional aid. I was sent for, and on hearing the particulars of the case, so far as the messenger could communicate them, I hastened to the house, accompanied by my former pupils, Drs. Busteed and Burtzell.

"The patient was pale and exhausted—her countenance was that of a dying woman—she was almost pulseless, with cold extremities, and the perspiration of death on her! In her death agony she supplicated me to save her, and said, with a feeling which none but a mother can cherish, that she was willing to undergo any additional suffering, if she could only be spared to her children. Poor creature! her measure of anguish was indeed full; and had she known that she was about being removed from her children by the atrocious butchery of men to whom she had entrusted her life, she would not have made the appeal she did. In approaching the bed of the dying woman, and on attempting to make a vaginal examination, to ascertain the condition of the womb, the head of the fœtus being still in its cavity, having been separated from the trunk, you may well imagine my feelings on finding a mass of small intestines protruding from the vagina, and lying between the thighs!

"The operators, not content with slaughtering the infant, had ruptured the uterus, through which the intestines escaped, and thus abandoned the woman! She lay in this condition three hours before I saw her, the doctors having left the house, stating nothing more could be done! Verily, death does terminate all human effort. The question may now be asked—Why was embryotomy had

recourse to in this case? I never could ascertain. There must have been a secret reason for it—the burning love, perhaps, which some men have for the *eclat* of bloody deeds. There was no deformity of the pelvis; the head of the fetus was of the usual size; and, as far as I could learn, it was an ordinary labor. The doctors judged it advisable to do something; they decided to turn and deliver by the feet. They accordingly proceeded, and, mistaking a hand for a foot, pulled it into the vagina. They were then foiled, and, in order to complete the delivery, commenced cutting up the fetus, and extracting it piecemeal. Thus were two lives wantonly sacrificed. The patient died in about two hours after I arrived; half an hour before she expired she observed—*‘My poor child was alive, for I felt it move when the doctors were tearing it from me!’* Such language, uttered under such circumstances, was indeed graphic and eloquent in condemnation of those who had been participants in this cruel tragedy.”

The melancholy case which I have just cited, harrowing as it is, unfortunately is not alone; its counterparts have not only been witnessed in the lying-in room, but the archives of the profession record many such. Giraud* says, “I have on several occasions been present when embryotomy was performed by the most distinguished practitioners, and the mothers have died immediately after the operation. In two instances, I myself assisted in extracting the fetus by fragments, and the mothers sank a few hours afterward; in one, the intestines passed through a laceration of the uterus, and projected from the vagina; in the other, the vagina and posterior wall of the uterus were frightfully lacerated!”

Mode of Performing the Operation of Embryotomy.—It must be kept in memory that this operation may be judged expedient by the accoucheur under several different circumstances; for example, when there is such an abridgment in the diameters of the maternal organs as to render it physically impossible for the child, without mutilation, to pass; where the maternal organs are normal in their dimensions, but the excessive size of the child constitutes the difficulty, as is illustrated in hydrocephalus; where there is no actual disproportion in the respective size of the child or organs, but where the obstacle consists in malposition of the fetus, which cannot be rectified either by the hand or through the agency of an instrument, and which, therefore, may call for the dismemberment of the child. Trusting that you will not fail to keep in view the line of argument which I have endeavored to lay before you, as to the justification of embryotomy, I shall now proceed to point out the mode of procedure usually adopted, after you have decided that the operation is a feasible and proper resource.

* Journal de Médecine. Par MM. Corvisart, Leroux, and Boyer.

The patient is placed on her back, and brought to the edge of the bed, occupying precisely the same position, already described, when delivery is to be accomplished either by version or the forceps. The bladder and rectum being previously evacuated, two fingers of one hand are to be introduced as far as the head of the child, to serve as a guide for the perforator or pierce-crane; if possible, the instrument should be made to enter the cranium through either the anterior or posterior fontanelle; or, if this cannot be done, any other portion may be selected, endeavoring, however, to avoid penetrating the sutures. As soon as the instrument has entered, the handles should be separated, so as to facilitate as much as possible the complete breaking up of the brain. If it be necessary, a small spoon may be employed for the purpose of bringing away the cerebral mass; and, if you are operating on a *living* child, allow me, in mercy, to beseech you to be thorough in your work of death, and see that the medulla oblongata is destroyed, in order that you may be spared the sad scene of witnessing the sobs of the poor infant after it has been brought into the world, mangled and mutilated!

If, after the discharge of the brain, and the collapse of the cranial bones, the head should not advance, then recourse may be had to the guard-crotchet, which may be inserted into the foramen magnum occipitale, the socket of one of the eyes, or behind the mastoid process. In addition, should it be found necessary, the bone forceps may be employed for the purpose of removing the bones of the head in fragments. As a general rule, when the head has passed, the trunk will follow without much difficulty; if however there be an obsta-



FIG. 96.

cle to its exit, the perforator may be introduced into the chest and abdomen, for the purpose of evisceration, thus diminishing the general bulk of the fœtus. Instances will occasionally occur, in which, after the delivery of the trunk of the child (without any pelvic deformity) the head becomes arrested at the superior strait, and the accoucheur is unable from malposition, or some other cause, to bring it into the cavity of the pelvis. Under these circumstances the perforator and crotchet may again be indicated.

In hydrocephalus,* provided there be evidence that the child is alive, I should caution you not hastily to decide on opening the cranium (Fig. 96) for the purpose of affording escape to the accumulated fluid, for, if the pelvis be natural, or even slightly contracted, it is possible that the efforts of the uterus may suffice to accomplish the expulsion of the fœtus, and this, too, consistently with its safety. Therefore, my advice is—*exercise a constant vigilance; sustain as far as may be, the courage and hopes of your patient, and do not have recourse to the perforator until you are satisfied of the inability of nature to terminate the labor, and that further delay would prove perilous to the mother.*



FIG. 97.

In a shoulder or arm presentation, it may happen that version cannot be performed; in such an event, it would be of little avail to attempt to amputate the arm, for this would in no way facilitate the delivery. It would be far better practice to introduce the curved instrument, with an internal cutting border (Fig. 97), for the purpose of separating the head from the trunk, as was originally suggested by Celsus; or, if this cannot be done, a pair of long scissors may be carried up, as Dubois recommends, in the following manner: The finger to be cautiously introduced with a view of ascertaining the position of the neck; as soon as this is done, the finger should be hooked round the neck to force it as near as possible to the upper strait, and then the scissors, carried up along the finger, will enable the accoucheur to complete the work of decollation. When this has been effected, traction should be made on the shoulder or arm which presents, and in this way the trunk will be brought down. The head, which

* It would seem that, in hydrocephalus, rupture of the uterus is not an unusual accompaniment. Dr. Thomas Keith has collected 74 cases of intra-uterine hydrocephalus, and in 16 of these, the uterus became ruptured during labor. It has therefore, been suggested in hydrocephalus, especially if the labor be prolonged, instead of resorting to the perforator, and consequently destroying the child, to introduce a small trocar for the purpose of evacuating the fluid, which does not necessarily involve the safety of the fœtus. [Simpson's Obstetric Works, vol. i., p. 654.]

of course remains within the uterus, is to be removed, as described in a previous lecture. There is still another alternative in these cases of arm or shoulder presentation, in which version is found impracticable; it is this—passing the finger along the arm or shoulder, as a guide to the axilla, the latter is penetrated by the perforator, and the chest eviscerated; this being accomplished, the delivery of the child, by making a lever of the arm, will not be difficult.

Cephalotripsy.—It is proper, before concluding this lecture, that I should direct attention to an alternative which, in the judgment of some distinguished and experienced accoucheurs, may with great advantage to the mother, be substituted for the crotchet and other instruments, employed for the extraction of the fœtus, after its cranium has been opened by the perforator. I allude to cephalotripsy, which consists in crushing the child's head by what is called the cephalotribe or embryotomy forceps, and thus extracting it through the maternal organs. It has been well remarked that the true dangers to the mother in craniotomy are in no way to be referred to the mere act of perforation, but arise altogether from the subsequent use of the crotchet, bone forceps, etc., which are employed for the purpose of completing the delivery. There is much truth in this observation, and in order to overcome these undeniable objections to the crotchet, etc., A. Baudelocque, Jr., some years since constructed an instrument, known as the embryotomy forceps or cephalotribe. It has, since its first introduction to the attention of the profession, undergone several modifications

by different accoucheurs, among whom may be named Cazeaux (Fig. 98), and Scanzoni. The cephalotribe of the latter is a good instrument, and will be found to answer very efficiently all the purposes for which it is intended. It is an error, however, to suppose that the cephalotribe can do away with the perforator; on the contrary, the true excellence of the instrument is developed only after the cranium has been previously emptied of the cerebral mass.

It has been demonstrated by numerous experiments made on dead fœtuses by Hershent, that, if the instrument be applied to the head previous to the evacuation of its contents by the perforator, the diameter in accordance with

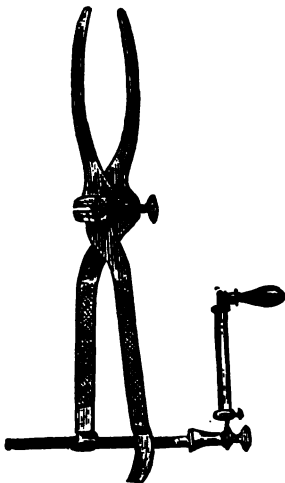


FIG. 98.

which it is grasped will be diminished, while the other dimensions of the head become increased. If, on the other hand, the cranium

be perforated and freed of the brain, and then crushed by means of the cephalotribe (Fig. 99), it is less voluminous, and the diameters much more contracted.*

But the advantages of the instrument are not limited to the head of the child; it may be employed with benefit, if the fœtus be dead, in difficult breech presentations; also, for the purpose of diminishing the volume of the thorax, should it be necessary after



FIG. 99.

the escape of the inferior extremities; and in some instances, in transverse positions of the trunk, when version cannot be effected in consequence of the impossibility of introducing the hand into the cavity of the uterus. One of the essential prerequisites for the use of the cephalotribe is a sufficient space in the pelvic canal to admit the passage of the fœtus after it has been crushed. If, therefore, there were not a space of at least two inches, the instrument could not be employed with any hope of success.

• Scanzoni.

LECTURE XLIII.

The Induction of Premature Artificial Delivery—Premature Artificial Delivery—How divided—When is the Fœtus viable?—The Period of inducing Artificial Delivery with the hope of saving the Child—What was it that first suggested a Recourse to it?—The History of the Operation—First performed in Great Britain—Statistical Tables showing the Diameters of the Fœtal Head at Different Periods of Development—The Opinion of Dr. Merriman and others, that Premature Delivery should not be attempted in the Primipara—Objections to—The Causes of Artificial Delivery—What are they?—Deformity of the Soft Parts sometimes a cause—Case in Illustration—Excessive vomiting in Pregnancy and Artificial Delivery—Examination of the Question—Statistics of Premature Artificial Delivery contrasted with those of the Cæsarean Section and Embryotomy—The various modes of inducing Artificial Delivery—Perforation of the Membranes—Ergot, Dilatation of Os Uteri by prepared sponge, according to the method of Kluge and Bruninghausen—Meissner's mode of Rupturing the Membranes—The Method of Kiwisch, or Water-douche—The Method of Cohen—Injection of Carbonic Acid into the Vagina as proposed by Dr. E. Brown-Séquard; its influence on contraction of non-striated muscular fibres—Induction of Abortion—Is it ever justifiable?

GENTLEMEN—In the two preceding lectures we have discussed the question of operative midwifery under two important aspects: 1. Whether the mother shall be subjected to a perilous alternative for the purpose of dividing the chances of life between herself and offspring; 2. Whether the child shall be mutilated, and brought into the world piecemeal, thus sparing the mother the hazards of an operation performed on her own person. But I desire you distinctly to recollect that the discussion of this question had reference to the female, who should not only have arrived at the completion of her pregnancy, but who was actually in labor at the time at which your opinion was to be determined as to the choice of one or other of these expedients. In the examination of this subject, and in the pursuit of truth, we were necessarily compelled to narrate facts and circumstances well calculated to sicken the heart, and draw largely on your sympathy. To-day we have a more agreeable duty to perform; for it is my purpose to present to your consideration an alternative, which will oftentimes not only do away with the necessity of the Cæsarean section and embryotomy, but will prove the means of greatly diminishing the destruction of human life. I allude to the *induction of premature artificial delivery*—one of the most precious boons which science has yet bequeathed to suffering woman.

Premature artificial delivery may be properly divided into two

branches: 1. When the fœtus is *viable*, or, in other words, has attained a degree of intra-uterine development, which will enable it to enjoy an independent or external existence; 2. Previously to the *viability* of the fœtus. These two divisions of the subject I shall now proceed to examine, giving to each, as far as I may be enabled to do so, its respective value and indications.

Premature Artificial Delivery when the Fœtus is Viable.—It is now very generally admitted that a fœtus at the end of the sixth month of gestation is capable of living independently of its parent; and there are not a few examples of fœtal viability at an earlier period than the completion of the sixth month.* It is an interesting circumstance to note that the first suggestion of the alternative of premature artificial delivery originated in the fact observed by accoucheurs, that women, who had previously been subjected to the use of cutting instruments, in consequence of pelvic deformities obstructing the passage of a living child at full term, had been delivered without a resort to these instruments, and with safety to themselves and offspring, when taken accidentally in labor at the seventh or eighth month of gestation. The earliest historical record touching this operation we find in the following language of Dr. Denman:† “A consultation of the most eminent men in London at that time (1756), was held to consider the moral rectitude and advantages which might be expected from this practice, and it met with their general approbation.”

England, therefore, is not only entitled to the honor of having decided the morality and utility of the expedient, but to one of her medical men, Dr. Macauley, is due the credit of having been the first to have recourse to it, and with success to both mother and child. Soon after this, it became a recognised alternative in Great Britain. It was also adopted in Germany, Holland, and other countries, but, strange to say, it was repudiated in France as a “cruel and inhuman” operation, and it was not until 1831 that it was resorted to in that nation for the first time by Stoltz, of Strasbourg, saving both mother and child. Since that period, it has met with general favor in France, and has been repeatedly performed.

* When discussing the interesting subject of premature and protracted gestation, it was stated that France had enacted a law granting to a child born six months, or one hundred and eighty days after marriage, all its social and legal rights; and this law, wise in itself, though often subject to abuse, is predicated on the fact that children are sometimes sufficiently developed at this early period of pregnancy to enable them to live. The law originated in the desire to protect the honor of the parent and the privileges of the child, in these instances of premature delivery; but it cannot be regarded as a guide to the induction of premature artificial labor, for the reason that the viability of the fœtus at the sixth month is to be considered an exceptional circumstance, whereas, at the seventh month, it assumes more the character of the rule.

† Introduction to Practical Midwifery, p. 396.

In our own country, it is also in favor. In a word, under justifying circumstances premature artificial delivery now holds a high place among the alternatives of the lying-in room; for it must be remembered that the object of the operation is not merely to diminish the dangers to the mother, but also to save the life of the child.

Let us examine what it is that gives facility to the passage of a living child at the seventh and eighth months, which cannot possibly be brought into the world alive at the full period of utero-gestation. In order to determine this question, and decide what the pelvic capacity must be to allow the expulsion of a viable fœtus, it will be proper to ascertain the diameters of the head at the different periods of pregnancy. When the head begins to engage, it is its biparietal or transverse diameter which traverses the antero-posterior of the pelvis, and consequently it is very important to have an accurate idea of the dimensions of the biparietal diameter.

The following tables of M. Figueira and Ritgen, which have been presented by Dr. Churchill,* are important, and elucidate fully this question :

Age of Fœtus.	Biparietal Diameter.	Occipito-Frontal Diameter.	Occipito-bregmatic Diameter.
7 months.	2 inches 9 lines.	3 inches 8 lines.	2 inches 10 lines.
7½ "	3 inches.	3 inches 9 lines.	3 inches.
8 "	3 inches 1 line.	3 inches 10 lines.	3 inches 1 line.
8½ "	3 inches 2 lines.	4 inches.	3 inches 2 lines.
9 "	3 inches 4 lines.	4 inches.	3 inches 4 lines.

According to Ritgen, premature artificial delivery may be induced at the

29th week, when the antero-posterior diameter of pelvis is 2 inches 7 lines.				
30th "	"	"	"	2 " 8 "
31st "	"	"	"	2 " 9 "
35th "	"	"	"	2 " 10 "
36th "	"	"	"	2 " 11 "
37th "	"	"	"	3 "

Allowing for the overlapping of the parietal bones, and the consequent diminution of the biparietal measurement of the fœtal head, it would appear that the extremes indicating the operation, all other things being equal, will be $2\frac{1}{4}$ and a fraction less than $3\frac{1}{8}$ inches, and, indeed, it might become a question, if the antero-posterior diameter measured even $3\frac{1}{8}$ inches, whether premature delivery would not present a better chance of life to both mother and child; for you are to remember that although we have stated that, as a general rule, a contraction of $3\frac{1}{8}$ inches is the smallest space through

* Theory and Practice of Midwifery, fourth London edition, 1860, p. 296.

which a living child can be made to pass at full term, yet its exit, if accomplished under this condition of things, would be attended by more or less peril.

Some writers* have urged, as an objection to the operation in a *primipara*, the difficulty of arriving at an accurate idea of the true size of the pelvis; they allege the insufficiency of the pelvimeter to reach this fact, and maintain that the real dimensions can only be approximated. I must confess I am unable to appreciate the strength of this objection; for it matters not whether the accoucheur can come within one or more lines of the actual extent of the antero-posterior diameter; what he desires is simply to *approximate* a knowledge of the physical condition of the pelvis, so that, with all the accessible facts before him, he may, assisted by other counsel, *decide whether or not the contraction is such as to render it morally certain that a living child cannot pass at the full term of pregnancy.* This cardinal fact being ascertained, then the question legitimately presses—What is the general character of the deformity? Is it such as to preclude the birth of a *viable* child? If not, there should exist no doubt as to the course to be pursued. If, however, the contraction be so marked, as to demonstrate the impossibility of the exit of a seven months' child, then the next alternative presents itself for consideration—the induction of abortion, which latter point will be fully examined before the close of this lecture.

While, for argument's sake, I am willing to accord a due degree of force to the objection, that the pelvimeter is oftentimes insufficient to allow us to judge of the real dimensions of the pelvis, yet I believe the experienced accoucheur will be enabled, under ordinary circumstances, by the introduction of the finger—the pelvimeter, in my opinion, *par excellence* in the exploration of the pelvis of a married woman—to ascertain whether the deformity is of a character to justify a resort to the operation now under discussion. Be it, however, as it may, the objections urged in reference to the *primipara* do not exist in the *multipara*; for, in the latter, we have a positive demonstration, not only of the existence, but the actual amount of the pelvic deformity. For example, suppose the case of a female, whose pelvis is so contracted that, having gone to the

* Dr. Merriman has no doubt exercised more than ordinary influence in the emphatic language he employs against recourse to premature artificial delivery in a *primipara*. With all respect for his name and authority, I cannot think he is right. The following are his words: "The practice should never be adopted *till experience has decidedly proved* that the mother is incapable of bearing a full-grown *fœtus* alive." [Medico-Chirurgical Transactions of London, vol. iii, p. 144.] If this opinion be recognised to the letter, it must, of necessity, to a greater or less extent, lead to disastrous results. It seems to me cruel to say the least, that the tenure of an infant's safety should be the previous destruction of its little relative before its transit into the world.

full period of gestation, she has been subjected one or more times either to the Cæsarean section or to embryotomy, for the reason that a living child could not be made to pass *per vias naturales*. Here, then, is the certain evidence of past experience—a proved fact—not a question of mere speculative opinion. It is, in truth, what is termed in law, the strongest and most irrefragable species of testimony. In a case, therefore, like this, there is no basis for a conflict of thought; the sacred obligation is imposed on the accoucheur, if the space be adequate to the passage of a viable fœtus, to induce premature action of the uterus, in order that both mother and child may be liberated from the perils of embryotomy or the Cæsarean section, should the mother be permitted to go on to her full term.

But, gentlemen, there are other conditions than a deformed pelvis, in which the operation of premature artificial delivery may very legitimately be regarded as a justifiable alternative; although in reference to some of them there has, and still continues to exist a marked difference of sentiment. For example, there are some women who, from disease of the placenta or other influences, are in the habit of bringing into the world dead offspring, the physical appearances showing that death occurred a short time before the completion of pregnancy. In cases like these, it has been proposed to have recourse to premature artificial delivery, for the purpose of saving the children; and again, the same alternative has been suggested in instances in which the volume of the fetuses, in several successive labors, has been such as to render their passage through the maternal organs, although presenting their normal proportions, physically impossible. Certain serious diseases of the gravid woman are also enumerated among the causes justifying this expedient—such as dropsy of the cavities, placing in more or less peril the life of the mother; aneurism and strangulated hernia, procidentia, or retroversio uteri, complicating gestation; the presence of abdominal tumors exercising an undue pressure on the uterus and other organs; an intra-uterine, or intra-pelvic growth, curtailing the dimensions of the pelvis to such a degree as to prevent the passage of a living child at maturity; contractions of the soft parts;* pro-

* The following is an interesting case of contraction of the soft parts in which I performed, on two different occasions, the operation of premature artificial delivery with entire success to both mother and children. The lady was a native of Canada. Her husband, some months after marriage, took her to South America, where she was delivered of a child. He stated to me that she had been suffered to continue in labor five days; and, after experiencing the most agonizing pains, she was spontaneously, in the absence of her physicians, delivered of a putrid fœtus of immense size. In two months after her delivery she began to walk about the room, and although weak, was otherwise in tolerable health. The first intimation she had of anything wrong, was excessive pain in any attempt at sexual intercourse; this proved to be impossible. In the course of a few weeks they sailed for New York; as

fuse uterine hemorrhage, whether accidental or unavoidable, before the completion of pregnancy, seriously compromising the safety of the mother; convulsions and excessive vomiting.

The various conditions I have just cited are to be weighed with due attention, and can only be considered as just motives for the operation after they have received the sanction of a calm and dis-

soon as they arrived, my late lamented and distinguished friend, Dr. Bushe, was consulted in reference to the case. At this time his health was so infirm as to disqualify him for professional duty. He sent a note to me by her husband, requesting that I would take this lady under my charge. On visiting her, and making an examination, I found the entire vulva in a state of adhesion, allowing only a small opening for the meatus urinarius. After hearing an account of her labor, this condition of things was easily explained. From the protracted and severe pressure of the head of the fetus against the walls of the vagina, inflammation ensued, resulting in sloughing and consequent adhesion of the vaginal parietes.

The indication in this case was obvious—the vagina needed restoration. Accordingly, I commenced an incision just below the meatus urinarius, and extended it about an inch downward; the knife soon came in contact with cicatrices so resisting, that it appeared almost as if I was cutting on iron. The incision being completed, I introduced a small sponge covered with oiled silk, and retained it in situ with the T bandage. Occasionally withdrawing the sponge, and renewing it, I found the vagina yielded slowly to this sort of pressure. With the aid of a small-sized rectum bougie, carefully introduced twice a week, and, after being withdrawn, replaced by the sponge, the vagina, in the course of a month, permitted the introduction of the finger. Then I had an opportunity of ascertaining its condition. It was filled with hard and unyielding cicatrices in the form of rings. Having succeeded in dilating the vagina to this extent, I recommended my patient to continue the sponge, and occasionally to introduce a larger-sized bougie. In about three months afterward I was visited by her husband, who seemed somewhat chagrined; he stated that it pained him to say that his wife thought she was again pregnant. This I found really to be the case, though it is manifest from what has been said, that sexual intercourse must have been attended with great difficulty. With this, however, I had nothing to do; the mischief had been done, and it was my duty to provide in the best possible manner for the patient's safety. The sponge and bougie, gradually increasing the size of both, were continued, and the vagina seemed to yield slightly to this equable pressure.

The patient having nearly reached the end of the seventh month of her gestation, I deemed it prudent to hold a consultation as to the propriety of resorting to premature delivery, feeling in my own mind that, although contractions of the soft parts do sometimes yield sufficiently to the combined influences of pregnancy and labor, yet, in her situation, it would, to say the least, be hazardous to the child to allow her to proceed to the full term. On proposing a consultation to the husband, he was anxious that a particular friend of his, Dr. Richardson, of Havana, then on a visit to this city, should be called in. This was accordingly done, and after a full consideration of all the circumstances, it was deemed prudent to bring on premature delivery. This I did, and delivered the lady of a healthy, living daughter. She again became pregnant, and went to the city of Baltimore, where she was delivered at full term, with the forceps, of a dead child, after a labor of six days' duration. In consequence of the contraction of the soft parts, the vagina was lacerated. About three years from her last labor, I was again consulted. She was pregnant, and, at the seventh month, I resorted to premature artificial delivery, the soft parts not being in a condition to justify delay until the completion of gestation. In this instance, too, the child was alive and healthy.

passionate judgment. In reference to convulsions, as a cause for the adoption of artificial delivery, it is to be remarked that the pregnant woman may be attacked with almost any grade of convulsive disorder; and if this latter, either under the form of catalepsy, hysteria, chorea, epilepsy, or the true puerperal eclampsia, should prove rebellious to remedies, and, *more especially, if the convulsion be traced to irritation of the uterus, and the life of the mother placed in peril*, I should not hesitate to liberate the organ from the irritation by promoting its premature action.

Excessive Vomiting as a Motive for Premature Delivery.—The subject of excessive vomiting in pregnancy, involving the life of the mother, has recently attracted much attention. In 1852 there was a remarkable discussion in the French Academy of Medicine, embracing more particularly the question—Is it ever justifiable to induce abortion in cases of excessive vomiting? The discussion grew out of a report submitted to the Academy by M. Cazeaux, and there was much conflict of opinion on the subject, the ultimate decision being one of a mixed character. It is conceded that pregnant women have occasionally died from the effects of vomiting; there are some striking instances recorded, and I am quite sure the unrecorded experience of practitioners could furnish many more examples. Without entering into a prolix discussion whether abortion is ever justifiable in these cases, it seems to me to be more a question of sound judgment than one of controversy; and, in this, as in all other instances, in which doubts may arise as to the proper course to be pursued in the treatment of disease, it is the paramount duty of the medical man to fortify himself in every possible way by an appeal to judicious and experienced counsel, together with a searching review of all the surrounding circumstances of each individual case.

In this way, with no preconceived opinion to sustain, with no prejudice to cloud his judgment, no false light to lead him into error, the sound physician will, I think, be enabled in these contingencies to arrive at a just decision; and, at all events, whatever he may do under the influence of such antecedents, will have been done with good and justifiable intent, and therefore will deserve, and must receive, the sanction of all right-thinking men. I cannot, for myself, recognise any difference between the decision of this question and multitudes of others more or less constantly presenting themselves to the practitioner while engaged in his daily rounds of duty.

Where is the physician who has not, at times, been almost bewildered in his desire to decide the nice question—*further depletion or stimulation*, in a case, for example, of pneumonia, pleurisy, or typhus, knowing, at the same time, that on the correctness of his decision must depend the life of the patient! In a case like this,

after the proper exercise of his judgment, looking merely at the safety of the invalid, whatever that judgment may indicate, or whatever the issue may be, I hold that the medical man has discharged his duty. So, gentlemen, is it in symptomatic vomiting, endangering, if not checked, the safety of the mother. Look scrupulously at all the circumstances, and if, with the aid of ripe counsel, you should be impressed with the conviction that the best if not the only alternative is in premature delivery—then, in my opinion, you would deserve rebuke if you withheld this means of relief; for, after all, the question to be determined is the simple but grave one—life or death—and the decision has nothing to rest upon but human judgment.

The two chief arguments employed by those, who oppose the induction of premature delivery for the cause under consideration, are: 1. That, in some instances, pregnant women, who have been supposed to have been almost in a moribund state from the exhaustion of vomiting, have recovered and brought forth living children; 2. That the physician is not justified in the performance of an operation, which necessarily leads to the death of the child. I do not perceive much force in this reasoning except in the abstract; and, when taken in connexion with all the circumstances presented by each case, it loses, in my view, all strength as a guide in practice. To the first argument, therefore, I reply—that if a woman, apparently moribund from long-continued and excessive vomiting, should recover and reach the full period of her gestation, it is a rare exception to a general rule, and, as an exception, utterly worthless as a precedent. Again: it is well known that women have died from the effects of this disturbance, who would in all probability have survived, if premature delivery had been resorted to. The second argument, it seems to me, is readily disposed of. The chances of saving the life of the mother, in these cases, are very much enhanced; and, without the operation, should the mother die, the life of the child is also sacrificed. But, I repeat, the whole question resolves itself into one of expediency, the word expediency in this case meaning—the interpretation which science, conscience, and a high morality may place on the necessity for action.

In connexion with this subject, it may not be uninteresting to cite the following instance in which it became necessary to induce premature action of the uterus in a patient affected with hydatids of that organ: I was requested to visit a lady in consultation with Dr. Whiting, of this city. Several medical gentlemen had, previously to my visit, seen and prescribed for the patient. When I saw her, in company with Dr. Whiting, she was apparently near dissolution. Her prostration was extreme; the countenance almost hippocratic; and, indeed, her friends had abandoned all hope of recovery. The particulars of the case are these: She was the

mother of one child, seventeen months old; about four weeks previously to my visiting her, she had occasionally been troubled with nausea and vomiting, and for the last two weeks had vomited more or less constantly. Nothing could be retained on her stomach, the vomiting having resisted every remedy which had been administered. It was under these circumstances that I was called to her. The medical gentlemen, who had previously visited her, had ordered cups, leeches, and blisters, over the region of the stomach, with various other remedies; but all without the slightest appreciable effect. The vomiting was still unchecked, and her death hourly expected. In examining critically the case, I came to the conclusion that the vomiting was merely a symptom of trouble elsewhere, and that no remedy addressed to the stomach would be of the least avail in rescuing her from the imminent peril in which she was placed. On applying my hand to the abdomen, I found the uterus enlarged, occupying the hypogastric region. The alarming situation of the patient precluded delay; if her life were to be saved, everything admonished us that it was to be done by instantaneous measures. My opinion was, that the vomiting was altogether sympathetic, occasioned by irritation of the uterus. I therefore suggested the propriety of endeavoring to bring about contraction of the organ, in order that its contents might be expelled. This view was concurred in by Dr. Whiting. Accordingly, with the doctor's full approbation, and at his request, desperate and almost hopeless as the case was, I at once introduced a female catheter into the uterus; in a short time strong contractions ensued, and a large mass of hydatids was thrown off. Almost immediately, as if by enchantment, the vomiting ceased. The patient, after a tedious convalescence from her extreme prostration, recovered, and is now in the enjoyment of robust health. Let this case impress on you the importance of tracing effects to causes; and bear in recollection this cardinal truth—that the practitioner who prescribes for mere symptoms will oftentimes find himself surrounded by obscurity, which will necessarily frustrate the successful treatment of disease.*

Statistics of the Operation.—It will be seen that no comparison can be instituted between the results, to both mother and child, of premature artificial delivery, and those obtained from the Cæsarean section and embryotomy. The mortality of the two latter alternatives has already been detailed; and we shall now, in contrast, present a brief schedule of the former. Prof. Hamilton† had re-

* Dr. Churchill records an interesting example in which he produced premature delivery at the sixth month, in a young woman pregnant with her third child, in consequence of excessive vomiting; he says, he "never saw such agony in any case" from the effects of vomiting. The mother "was delivered of a dead fœtus, recovered rapidly, and has since borne a child at full term."—Churchill's *System of Midwifery*, p. 282.

† *Practical Observations*. 1840. P. 285.

course to premature artificial delivery forty-six times, and forty-two of the children were born alive; on one of his patients he performed the operation ten times. Dr. Ramsbotham,* under some very discouraging circumstances, induced labor prematurely sixty-two times, and more than one half of the children were saved. Dr. Merriman,† in his own immediate practice, and in consultation, has met with thirty-three cases in which the operation was performed, and nearly a third of the children saved. Dr. Robert Lee‡ had recourse to premature artificial delivery twelve times in one woman with complete success. In two hundred and eighty cases collected by M. Figueira, one hundred and sixty-six children were saved, and only six mothers died. In the sixty-two cases occurring in the practice of Dr. Ramsbotham, more than one half of the children were saved, and not one mother lost. Kilian, up to 1831, had gathered from various sources one hundred and sixty-one operations, the results of which were one hundred and fifteen living children, and eight mothers lost. It is, however, stated that five of these eight died from causes altogether unconnected with the delivery. It will be thus perceived that, in premature artificial labor, considerably more than one half of the children are rescued, with the insignificant mortality of one in fifty of the mothers! Admitting, therefore, that this operation should be had recourse to under circumstances fully justifying it, it cannot, I think, but be regarded as one of the brilliant substantial triumphs of science, opening to the contemplation of the conscientious accoucheur a gratifying and cheerful vista, and, at the same time, closing up an avenue, which has proved so destructive to human life.

The Various Modes of Operating for the Induction of Premature Artificial Delivery.—These may be enumerated as follows: 1. The perforation of the membranes, for the purpose of affording escape to the liquor amnii; 2. The administration of ergot; 3. The dilatation of the os uteri by means of prepared sponge, known as the method of Kluge and Bruninghausen; 4. The method of Kiwisch, consisting of vaginal injections; 5. The vaginal tampon; 6. Cohen's method, consisting of injections into the cavity of the uterus; 7. The injection of carbonic acid into the vagina; 8. Gal-

* Dr. Ramsbotham observes, "It occurred to me between the years 1823 and 1834, to be compelled to induce labor prematurely forty times. This may seem, perhaps, a very large number; and, in explanation, I may state that the extensive Charity, which has supplied the principal part of these cases, embraces the district of Spitalfields and Bethnal Green, which, I believe, contains more females with deformed pelves than are to be met with over the same quantity of square acres in any other part of the kingdom. In most of the patients, also, the operation has been repeated, and some have undergone it five and six times."—*Ramsbotham's System of Obstetrics*, Keating's edition, p. 315.

† Merriman on Difficult Parturition, p. 172.

‡ Medical Gazette, Feb. 7, 1851, p. 245.

vanism as suggested by Dr. Radford. I now propose briefly to examine each of these propositions.

Perforation of the Membranes.—The first suggestion, that of perforating the membranes, is undoubtedly the most reliable so far as the mere production of uterine contraction is involved; but it has certain counterbalancing inconveniences. It is known in Germany as the method of Scheele, although it is recorded that Macauley had recourse to this very expedient in the operation, which he was the first to perform in England for the induction of premature delivery. The true objections to the perforation of the membranes are—that the escape of the liquor amnii* necessarily brings the walls of the uterus more or less in contact with the surface of the fœtus, thus incurring the hazard, through undue pressure on the cord, of destroying the child by an interruption of the placento-fœtal circulation; again: the employment of a sharp instrument, with the object of perforation, will be likely to produce injury to the uterus; and it is also to be remembered that the presentation of the pelvic and other portions of the fœtus than the head, is far more frequently met with in premature than in full term births;† and this latter fact would consequently enhance the dangers to the child,‡ in the event of its becoming necessary to perform version after the exit of the amniotic fluid. Paul Dubois§ states that in the Maternité of Paris, during 1829 and the three succeeding years, of one hundred and

* In order to obviate the objection that, in perforation of the membranes, the liquor amnii escapes in full quantity, Meissner, of Leipsic, has contrived a mode of opening them so that he can control the amount of fluid discharged. This he accomplishes by penetrating the membranes at a distance remote from the *os uteri*, by means of a long curved trocar embraced in its canula. He first introduces the canula alone between the posterior surface of the membranes and internal wall of the uterus, and being assured that the upper extremity is turned toward the sac of waters, the trocar is then introduced through the canula, and made to penetrate the membranes; as soon as this is done, the extremity of the canula is carried into the opening made by the trocar, and the latter is immediately withdrawn. In this way, Meissner says he can draw off sufficient fluid to cause the uterus to contract, without endangering the life of the child by the loss of the entire quantity. It does seem to me, that the idea has at least plausibility to recommend it; but the carrying it out practically—though no doubt feasible in the skillful hands of its author—would prove a most difficult operation, and apt, also, to endanger the lives of both mother and child, in consequence of injuries inflicted upon them. Therefore, while mentioning the operation of Meissner as a part of obstetric history, it is my duty to caution the practitioner as to its too hasty adoption. At the same time, it is but just to remark that Meissner has recorded fourteen cases in which this plan has been adopted with safety to both mother and child.

† See Lecture iii.

‡ This only applies to those cases in which the child presents crosswise; for, I have very emphatically stated that, all things being equal, delivery can be accomplished consistently with the safety of parent and offspring, in either a breech, knee, or foot presentation.

§ Mem. de l'Académie Roy. de Méd., vol. ii., p. 271.

twenty-one fœtuses born before the completion of seven months, fifty-one presented the pelvis, and five the shoulder. This experience is amply confirmed by all good observers. In the thirty-three cases in the practice of Dr. Merriman, fifteen presented preternaturally, and in the forty-one quoted by Dr. Ramsbotham, fourteen were preternatural. It may be mentioned here, that Stoltz recommends in cases of premature artificial delivery—if it be previously ascertained the fœtus occupies an irregular position—before bringing on labor, that an attempt should be made, through external abdominal version, to change the presentation to one of the head. To this there can be no objection in any cross-presentation of the fœtus; but, as has been already stated, it should be limited to this latter presentation, and not had recourse to when either of the pelvic extremities is at the superior strait.

Administration of Ergot.—The second method—the administration of ergot—is to my mind extremely objectionable, although in the advocacy of its use under these circumstances by Dr. Ramsbotham it certainly has the sanction of high authority. This author first administers ergot, say four or five doses, at intervals of four to six hours, and then ruptures the membranes. Paul Dubois, also, commends the employment of this drug in these cases. The promiscuous administration of ergot, for the induction of premature artificial delivery, must occasionally be attended with serious consequences to both mother and child. For, in the first place, the justification of the operation is founded partly on the fact that there is such a contraction in the bony or soft structures of the mother—or such an excess of development in the fœtus—as seriously to endanger her life and that of her child, if she be permitted to pass on to her full term. Now, if one of the obstetric extremities of the fœtus should not present at the superior strait—and this cannot always be ascertained before the dilatation of the uterine orifice—to administer ergot would be to ensure the death of the child, and incur the hazard of grave lacerations to the mother. In all cases, therefore, be it remembered, in which the child may present crosswise, or in any other position so as to cause a disproportion between it and the parts through which it has to pass, ergot is certainly contra-indicated.

Dilatation of Os Uteri by Prepared Sponge.—The dilatation of the os uteri by the prepared sponge, as suggested by Bruninghausen and Kluge, is, likewise, not without its objections. For instance, it may be found extremely difficult, in consequence either of resistance or malposition of the os, to introduce the sponge, and the abortive efforts made to accomplish the object may induce more or less irritation of the parts. It must, however, be conceded that it possesses a very marked advantage over the process of perforating the membranes, and allowing the liquor amnii to escape, for, in this case, as we have remarked, the safety of the child is more or less

compromised. The manner of performing the operation is as follows: Take a piece of prepared sponge, about three inches in length, conoidal in shape and properly pointed, with a string attached to the outer extremity so that it may, when needed, be withdrawn. Instead of employing the speculum for the purpose of introducing it—an unnecessary annoyance and exposure of the patient—it will suffice to carry the index finger of one hand as far as the *os uteri*, and grasping the sponge with a narrow forceps it should be made to glide along the finger, which will act as a guide; in this way, it is introduced into the mouth of the organ, care being exercised not to penetrate too far, for fear of rupturing the membranes; and it is then to be secured by the tampon. The sponge thus arranged may be permitted to remain unchanged, should the uterus not be brought into action, for ten or twenty hours; at the end of this time it should be withdrawn, and for the purpose of removing irritation, the vagina thoroughly injected with tepid water. The first sponge is then to be substituted by one slightly larger, if it be found necessary. If, however, after two or three days' trial, the contractions of the uterus be not provoked—an unusual circumstance—it must be laid aside, and some other expedient had recourse to. The *modus operandi* of this method is quite apparent, the sponge absorbs the moisture, always in more or less quantity about the *os uteri*; as a consequence, it enlarges, acting as an irritant on the incident excitator nerves of the vaginal-cervix, and thus, through reflex movement, brings on the needed contractions.

Method of Kiwisch.—The method of Kiwisch, of Wurtzburg, known as the *water-douche*, was introduced to the attention of the profession in 1846, and is, perhaps, under ordinary circumstances, the safest and most reliable of all the plans yet proposed for the induction of premature delivery. It consists in throwing a stream of water against the *os uteri* continuously for ten or fifteen minutes; and, to render the action of the stream more certain, the fluid should be alternately cold and warm. The suggestion of Kiwisch has met with very general favor; its *modus operandi* is, also, through reflex action. One of the advantages of the method is that it does not subject the patient to the necessity of keeping her bed, nor is it accompanied by the inconveniences of the other means already alluded to. The injection of the water may be repeated once in three or four hours until contractions of the organ are induced.

Vaginal Tampon.—The vaginal tampon has been suggested by Scheller, as a means of inducing artificial delivery. It is well known* that the pressure of the tampon against the *os uteri* will, in many cases, provoke action of the organ; and consequently it has been proposed as a suitable agent. It is, however, apt to occasion more or less suffering to the patient, and is now generally aban-

* See Lecture xxxi.

done, for the more substantial reason that it is superseded by more efficacious means.

Method of Cohen.—Next, there is the method of Cohen, which consists, through the agency of a curved tube, in throwing fluid into the cavity of the uterus itself. This plan has its advocates, but it seems to me is not so efficient as the proposal of Kiwisch.

Injection of Carbonic Acid.—I should not omit to mention the use of carbonic acid as a means of inducing premature action of the uterus. Dr. Brown-Séquard was the first to direct attention to its influence in causing contractions of non-striated muscular fibres. His observations on this subject will be found in the *Memoirs of the Society of Biology*, 1849 and '50, and also in his work entitled, "*Experimental Researches applied to Physiology and Pathology*," 1853, p. 117. Scanzoni, Simpson, C. and J. Braun, led by the experiments of Dr. Séquard, have employed this agent with complete success in several instances, not only as a means of provoking early contractions of the uterus, but also in inertia of the organ. The gas is injected into the vagina, and is quickly followed by marked results.

Galvanism.—Galvanism was suggested by Dr. Radford, of Manchester, in 1844, and he employed it with success in four cases of contracted pelvis; so also have Dr. Barnes and others been fortunate with this agent.

Induction of Abortion—Is it ever Justifiable?*—It now remains for us to examine the important question—is abortion, under any circumstances, a justifiable alternative? This question has been much controverted, and it is one on which the sentiment of the profession is not concurrent. In order that the special points in the discussion may be fully appreciated, they may be advantageously presented under the two following heads: 1st. When the maternal passages are so contracted—no matter from what cause—as to render it certain that a *viable* fœtus cannot be made to pass. 2. When the maternal passages are normal, but the mother's life is involved in alarming peril by the occurrence of some serious complication, such as convulsions, hemorrhage, or excessive vomiting. It is manifest that the moral part of the question turns upon the simple interrogatory—is the embryo in the earlier states of its existence a living being? All correct physiology demonstrates that it becomes in truth, at the very moment of fecundation, imbued with vitality—the contact of the sperm cell and germ cell constituting the *act of the breathing of life*. Jörg, of Leipsic, I believe, alone claims the doubtful merit of describing the human fœtus as

* It is not of course intended here to discuss the general question of *criminal abortion*, which has become, both at home and abroad, a monstrous crime, owing in great measure to the laxity with which the laws on the subject are enforced. I may refer the reader to an instructive paper entitled "*Criminal Abortion in America*," by Heratio R. Storer, M.D., 1860.

“only a higher species of intestinal worm, not endowed with a human soul, nor entitled to human attributes.” With his infidel notions on this point he might have added—*nor is the shedding of its blood of any more moment than the slaughtering of the calf!*

Besides the proofs of physiology, we have the testimony of the early fathers of the Catholic church; that church has always maintained, with an unwavering consistency, so characteristic of its canons, that the destruction of the fœtus in the womb of its parent, at any period from the first moment of conception, is a crime equal in turpitude to *murder*.*

Assuming, therefore, as an incontrovertible fact that the human embryo is in reality a living being, the suggestion naturally arises—**are we justified, and, if so, under what circumstances, in depriving it of its life?** It is quite certain that the only plea for such an alternative is the safety of the mother; and as to the force of this plea there has always existed a difference of opinion. Here, then, we have the naked question—a woman is pregnant, carrying within her a living being—her pelvis is so abridged that it will be physically impossible to afford exit to a *viable* fœtus, and, consequently, if she proceed to her full term, the only chance of rescue will be the Cæsarean section or embryotomy. Now, I repeat, what, under these circumstances, is the duty of the conscientious accoucheur, who is not actuated by a thirst for innocent blood, but who is most anxious to discharge with fidelity the sacred obligations which his profession imposes upon him?

I cannot undertake to determine this question for others—it is one which must be left to conscience and a sincere desire, as far as may be, to do what is right. But, in no event, should a decision be arrived at without first invoking the aid of wise counsels, and duly considering all the surroundings of the case.

On the other hand, suppose the instance of a pregnant woman, with a perfectly normal condition of the maternal organs, but who has not yet attained that period of gestation at which the child is viable—and she should suffer from some serious complication which would subject her, according to all human evidence, if not delivered, to the loss of her life—what, in this contingency, is the course to be pursued? Here, in my judgment, the *morale* of the case is greatly changed; for should the mother sink, in consequence of not being delivered, her child, also, must of necessity be sacrificed. Therefore, under these circumstances, if my convictions as to the danger to the mother were beyond a peradventure, I should not hesitate to induce abortion upon the broad ground that, *without the operation two lives would certainly be sacrificed, while, with it, it is more than probable that one would be saved.*

* For an elaborate discussion of this whole question, see the Dublin Review for April and Oct. 1858.

LECTURE XLIV.

Puerperal Fever—Synonyms; its Fatality most Fearful—What is Puerperal Fever?—Is it a Local Phlegmasia?—Objections to the Hypothesis—Is it in its Nature a Toxæmia, or Blood Poisoning?—Proofs in Demonstration of this Opinion. Humoral Pathology—Puerperal Fever not confined to the Parturient Woman; it may attack Young Women, Pregnant and Non-Pregnant Women, New-born Children, and the Fœtus in Utero. The true Meaning of the Term Puerperal State—Divisions of Puerperal Fever—Epidemic and Sporadic—Is it contagious: Discrepant Views; Proofs that it is a Zymotic Disease; Contagion accomplished only through an Animal Poison—Prof. Arneth's Account of Puerperal Fever in Vienna Hospital—Its Propagation through Dissections. The Question of Transmissibility through Decomposed Matter. Causes of Puerperal Fever. Symptoms—How Divided—Their Value—Anatomical Lesions—Not Uniform—Sometimes the only appreciable Change is in the Blood. Diagnosis—With what Affections Puerperal Fever may possibly be Confounded. Prognosis—in the Epidemic Form generally unfavorable; the usual Preludes to a Fatal Termination readily detected by the observant Physician. Treatment—Divided into Prophylactic and Remedial—Prophylactic—in what it Consists. Dr. Collins's Sanitary Measures in Dublin Lying-in Hospital—Results. Epidemic Puerperal Fever not always confined to Lying-in Hospitals; its occasional Ravages in large Cities and Villages. Remedial Treatment—Depletory Remedies—When employed—Stimulants; when indicated. Opium Treatment; the Veratrum Viride.

GENTLEMEN—I propose to-day to offer some general remarks on a disease, connected more or less directly with child-birth, than which there is, perhaps, no malady to which the female is liable that has called forth more discrepant opinions, or enlisted in its discussion abler and more accomplished minds. Writers in the profession of the very highest order of intellect have been engaged in the study of this question—and in defiance of the marked ability with which it has been examined, the result still is that we are without a united verdict. I allude to what is generally known as *puerperal fever*. This affection has been described under a variety of names, such as—*Febris puerperalis*, *febris puerperarum*, *peritonitis*, *morbus puerperarum*, *metritis puerperalis*, *uterine phlebitis*, *child-bed fever*, etc. When it prevails in its epidemic form, it is fully entitled to be denominated the scourge of the lying-in room. Its mortality even now, with all the advances of modern scientific investigation, is appalling, although it has undergone a comparative diminution from former periods of its history. Indeed, at one time, a recovery from this fearful malady was the exception, while the

rule was death!* It, therefore, is a subject well worthy of investigation; to the accoucheur it is one of the deepest interest.

I shall not attempt a history of this destructive affection, nor shall I venture to impose upon you an array of the conflicting testimony which has been presented touching its nature. I prefer rather, as briefly as may be consistent with the importance of the subject, to discuss it under the following heads: 1st, *What is puerperal fever?* 2d, *What its divisions?* 3d, *Is it contagious?* 4th, *Its causes.* 5th, *Its symptoms.* 6th, *Its lesions.* 7th, *Its diagnosis.* 8th, *Its prognosis.* 9th, *Its treatment.*

What is Puerperal Fever?—The earlier writers regarded every form of fever occurring at the time of child-birth as *puerperal*, and hence their views were extremely vague. No less precise and satisfactory are some of the modern teachings on this vexed question. We are told by one school that puerperal fever is an essential or specific disease—by another, that it is simply a local inflammation of a sthenic or active grade—again it is maintained that the phlegmasia is asthenic, assuming at its very inception a low typhoid type. In the opinion of some, it is in close alliance with hospital gangrene, while others hold that it partakes more or less of an erysipelatous inflammation. A prominent hypothesis, sustained with no little ability by Dr. Robert Lee, would seem to refer the true source of the malady to uterine phlebitis; and so I might proceed to enumerate other individual opinions as to the real nature of the disorder under discussion, but such an enumeration would be without profit, and, therefore, I omit it. It does really appear to me that, in the multiplied hypotheses which have been presented in the attempted exposition of the essential nature of puerperal fever, there has been a sad confounding of terms. For example, simple peritonitis, metritis, etc., purely accidental, and, if you choose, sporadic, totally unconnected with epidemic or typhoid influence, and liable to occur from cold, or the exercise of any other ordinary agency, have too often been regarded as the very types of puerperal fever; and their inception, together with their progress and phenomena, looked upon as the reliable exponents of the epidemic puerperal disease, which is, as we shall attempt to demonstrate, an entirely different pathological derangement. It is to be remembered that both the pregnant, parturient, and non-pregnant female may be attacked with peritonitis or metritis, precisely as the male may be invaded by pure inflammation of the peritoneum. Here,

* It is recorded by M. Malouin, in his account of the epidemic at Paris, in 1746, that scarcely one woman recovered. Prof. Young, describing the disease as it occurred in the Royal Infirmary, Edinburgh, 1773, says: "It began about the end of February, when almost every woman, as soon as she was delivered, or perhaps twenty-four hours after, was seized with it, and *all of them died*, though every method was used to cure the disorder."

then, there is nothing specific—nothing essential. It is, if I may so term it, *an inflammation under ordinary circumstances, and is to be treated on ordinary antiphlogistic principles*. In this form of peritoneal inflammation, I repeat, we are not to seek for any specific or mysterious something, which has produced the affection. But it is a vastly different thing when true epidemic puerperal fever prevails—a fever usually characterized by depression of the vital forces, and exhibiting many of the phenomena of a typhoid affection.

With the distinction just made, the question now before us, naked and deprived of all collateral and adventitious issues, is—*What is Puerperal Fever?* Is it in its origin a local disease—a phlegmasia—and are the constitutional disturbances simply effects? Or is its starting-point in the constitution, and the local lesions merely results? The whole matter is, it seems to me, narrowed down to these two inquiries; and let us briefly examine them.

Those who maintain that the origin of the disorder is traceable to a local phlegmasia have, with some slight show of reason, based their opinion on the circumstance that, in almost all the fatal cases of puerperal fever, autopsical examination has revealed the evidences of inflammation of the peritoneum, the uterus, its veins, or some of its appendages; and, therefore, they associate the relation of cause and effect. No one will attempt to deny, with our present knowledge of pathology, that the lesions named are, more or less, accompaniments of the puerperal affection; and it will also be admitted, that the lesions are by no means confined to these structures. Some of the ablest pathologists, and among others Rokitsky, have demonstrated that the mucous lining of the alimentary canal and of the respiratory organs, the pleura, and the articulations themselves, will not unfrequently afford evidence of change of structure, under the form of exudations, congestion, or purulent secretions. But admitting the lesions to exist—and the fact cannot be controverted—do they prove that the source of puerperal fever is in the primary inflammation of some one or more of these structures? I think not; and the hypothesis develops, in my judgment, the frequent fallacy of the *post hoc propter hoc doctrine*.

To my mind, one of the most powerful—indeed, it is irresistible—arguments against the local origin of puerperal fever, is, that occasionally, in certain marked and fatal cases of this disease, the pathologist has been unable to recognise the slightest appreciable trace of inflammation in any of the viscera designated as the starting-point of the malady. This fact has been well pointed out in the researches of Dr. Ferguson, Tessier,* Tardieu,† Depaul,‡ and

* Tessier, *De la Diathèse Purulente*, p. 312. 1838.

† Tardieu, *Journal des Connaissances Médico-Chirurgicales*, 1841, p. 233.

‡ Depaul, *Bulletin de l'Académie de Médecine*, t. xxiii, p. 395.

others. This being so, it is difficult to conceive with what degree of consistency the theory can be sustained, for certainly one affirmative is worth a thousand negatives. Other arguments might be adduced, such as the occurrence of peritonitis, metritis, etc., in the parturient female, unaccompanied by any of the constitutional disturbances ordinarily characteristic of puerperal fever; but the accumulation of further proof I do not deem necessary, and I have no hesitation in avowing that, as far as I can understand it, the entire weight of proof is adverse to the hypothesis.

If, therefore, puerperal fever be not traceable to a local phlegmasia, what is its true source? A number of able observers have referred the origin of the affection to a peculiar altered condition of the blood—to a poison introduced into this fluid—in a word, they maintain that it is a veritable toxæmia, and in this view I fully concur. In my opinion, the whole chain of evidence on this point is in demonstration of the sentiment of Dr. Ferguson, that “the phenomena of puerperal fever originate in a vitiation of the fluids, and that the various forms of puerperal fever depend on this one cause of vitiated blood, and are readily deducible from it.”* But you may very naturally ask, What is this poison, and how does it reach the blood? The real essence of the contaminating element it may not be so easy to explain; it is one of those mysterious, subtle somethings which is more or less frequently met with, exhibiting varied pathological phenomena, and oftentimes resulting, with remarkable promptitude, in the extinction of life. You may call it, after some of the older writers, a *ferment* or a *morbific matter*, but this in no way facilitates the solution of the inquiry—what is this poison?

Toxæmia, or blood-poisoning, is a generic term, and exhibits several varieties: in one instance it results in scarlet fever, in another in small-pox, in another in measles, in another in puerperal fever. Here, by some of the schools, I shall be charged with advocating humoral pathology, which has too generally been regarded as a doctrine long since exploded. I have only to say in reply, that I always endeavor to advocate truth, and do not believe in restricting our science to any exclusive dogmas—“*Je prends le bien où je le trouve.*”

Indeed, if time permitted, it would be an agreeable task to examine somewhat in detail whether the doctrine of humoral pathology is altogether a phantom, without a shade of scientific basis, as some of the schools maintain. The examination might, perhaps, result in the conviction that some of the finest displays of modern science, under the ministrations of organic chemistry, have not only rendered plausible, but have absolutely demonstrated, the truth of the doctrine of “peccant humors,” as taught by the early fathers.

* Ferguson on Puerperal Fever.

Hippocrates himself inculcated that fever was but the offspring of accumulated morbid matter in the blood, which, after a certain number of days, through a process of fermentation, was thrown off either by hemorrhage, alvine evacuations, the perspiratory surface, or through the development of some of the exanthemata. It does seem to me that the doctrine of fermentation finds a clever advocate in the distinguished cultivator of organic chemistry in our day—Liebig. His explanation of the morbid phenomena consequent on blood-poisoning is strongly kindred to the ancient theory.

It is important to note that, when blood-poisoning exists, its effects are not always identical; there are marked grades of severity, and this is abundantly exemplified in scarlet fever. In some instances this latter affection assumes an extremely mild form—the *scarlatina simplex*—in other cases it proves the terror of the household, seizing its victim in the full bloom of health, and terminating life in two or three hours—the *scarlatina maligna*. In puerperal fever, also, there will be observed a modification in the action of the poison, the disease being at times comparatively light, and again exhibiting a fearful virulence.*

If we cannot explain the essence of the poison, yet observation proves that its influence on the economy may be very materially affected by certain conditions, such as the state of the atmosphere, the locality, etc.

The testimony is ample showing a connexion between puerperal fever and erysipelas. The two diseases may prevail simultaneously in the same neighborhood; or if erysipelas alone prevail, a third party may communicate, from a patient affected with it, puerperal fever to a woman recently delivered.†

On the other hand, well-authenticated instances are recorded of husbands and nurses, in attendance on women dead of puerperal fever, having been attacked with erysipelas; and Dr. Rigby‡ states that in an epidemic which prevailed in the General Lying-in Hospital, London, the child of every female in whom the disease proved fatal died of erysipelas in a few hours.‡

* Diseases produced by blood poisoning have one especial characteristic—they are usually sudden in their invasion, and after running a fearful course for an indefinite period, as suddenly disappear. This is within the experience of all vigilant practitioners. We recognise the fact constantly in yellow fever, cholera, typhus fever, measles, scarlet fever, puerperal fever, &c., all of which are due to the operation of a morbid poison. In a pathological sense, the seat of lesion in the various affections resulting from a toxæmic influence is not without interest. In scarlatina and measles, for instance, the development is on the cutaneous surface; in typhoid fever the glands of the small intestines are more or less involved, while in cholera it is the general gastro-intestinal mucous surface. In puerperal fever the serous surfaces, and more especially the peritoneum, are usually affected.

† In constitutional erysipelas, whether affecting the male or the non-pregnant female, a not unusual lesion will be inflammation of the peritoneum.

‡ Rigby's Mid., p. 392.

Although, as a general rule, puerperal fever attacks the parturient female,* yet it should be recollected that it is not exclusively confined to this class of patients. Young women, married and non-pregnant women, the new-born child,† and the fœtus in utero, even when the mother has no symptoms of the disease, are all liable to the affection; instances are recorded of its existence under these circumstances; and what may surprise you still more, it has been shown that, in some cases, the male, if subjected to the peculiar poison known to generate the disease, will become sick, and exhibit lesions more or less in accordance with those found in women affected with puerperal fever. While it is proper to mention these exceptional cases, the important fact is, that in the great majority of instances, the disease attacks the parturient female—and I am inclined to adopt the explanation of the circumstance given by Trousseau, in the recent discussion of this question in the French Academy of Medicine—he says the lying-in female exhibits a peculiar *morbid opportunity*, and presents a *remarkable pathological aptitude* for the malady.

Both in sporadic and epidemic puerperal fever, the special poison generating the disease may originate in the person of the parturient woman, and be conveyed into her blood through the absorption of putrid coagula, portions of placenta, &c.; but there are other modes by which the poison may be communicated, to which we shall refer under the head of contagion.

What are the Divisions of Puerperal Fever?—It has already been remarked that there are two distinct varieties of this disease—one known as the *sporadic*, the other assuming the *epidemic* form. The characteristic of the former is that it is an isolated affection, and does not extend; while the epidemic variety is not limited to one or two cases, but involves districts and neighborhoods, oftentimes proving frightfully destructive. Some authors have made other distinctions, which do not appear to have much practical importance—such as *inflammatory* puerperal fever; *bilious* or *mucous* puerperal fever; *typhoid* puerperal fever, etc.

* The following is the language of Tarnier, and I quite agree with him in opinion: "In ordinary medical phraseology, the term *puerperal state* is understood to mean the particular condition presented by the recently delivered woman. This definition is entirely too limited. I adopt the division recently proposed by M. Monneret, viz. The first period of the puerperal state commences with conception; the second comprehends the puerperal state of all authors, that of the newly delivered female; the third period includes the entire term of lactation. To these three divisions I shall add a fourth—that of menstruation. In menstruation, in gestation, and in parturition, I can see but a series of inseparable facts, which tend to the same object—the reproduction of the species." [De la Fievre Puerpérale, observé à l'Hospice de la Maternité par Stephane Tarnier. Paris. 1858.]

† Puerperal fever in the recently delivered female, the fœtus, and the new-born child. By M. Lorain. Paris, 1856.

Is Puerperal Fever Contagious?—The views on this point are far from being concurrent; and one of the most emphatic advocates of the non-contagious character of the affection is our distinguished countryman, Prof. Meigs of Philadelphia; he is also sustained by Prof. Hodge, the able Prof. of Midwifery in the University of Pa. It is somewhat singular that these two gentlemen, ripe observers, and engaged as they have been in extensive practice, should so positively maintain an opinion in opposition, it seems, to me, to evidence which, if thoroughly examined, is irresistible.* I do not deem it necessary to cite particular examples in which puerperal fever has been conveyed through the principle of contagion—they are so numerous, and so free from all doubt—in a word, they are so conclusive that I cannot conceive how they can be regarded otherwise than completely demonstrative of the point at issue. I have already remarked that puerperal fever may, under certain circumstances, originate with the patient herself. She may, so to speak, inoculate herself with the noxious element through absorption of putrid coagula, or portions of the placenta remaining in the uterus; or she may derive the affection from the passage of some of the products of inflammation into her blood; or the translation of the disease may be by contagion through the intervention of a third party; and again, the inoculation may be traceable to the hand of the accoucheur carrying the poison into the system during his vaginal explorations. The question of the possibility of transmission of puerperal fever by the physician has received fresh support within a few years from some German investigators.†

* Dr. Holmes, of Boston, has discussed this question of contagion most elaborately, and I refer the reader to his admirable paper.

† In an interesting paper by Dr. Arneth, of Vienna, we have the following statement: Dr. Semmelweiss, assistant to the Prof. of Midwifery, was struck with the difference as to the prevalence of puerperal fever in the two clinics of the hospital; in one of these clinics, the pupils are midwives; in the other, medical students. The latter were, almost without exception, in the constant habit of assisting at autopsies, of which there were eight or ten nearly every day. The dissections were sometimes made by the students; or at least they handled the pathological preparations, and carefully examined them. Moreover, the assistant was accustomed to lecture on the obstetric operations which were performed on dead bodies. After such investigations on the cadaver and such practice, it was not rare for the students to proceed immediately to the wards of the lying-in hospital, and examine the pregnant and parturient women. The pupils of the other clinic, being midwives, did not take any share in the occupations just alluded to; and even the assistant of that clinic had comparatively but seldom to do with post-mortem examinations, as it was not a part of his duty to instruct midwives in pathology or in operative midwifery. Having convinced himself that the great prevalence of the disease in his wards was caused by the inoculation of the female genitals, Dr. Semmelweiss entertained the hope of being able to diminish the frightful mortality. He finally deduced from his researches these conclusions—Any fluid matter in a state of putrefaction, communicated by linen, by a catheter, by a sponge, by small particles of the placenta, or even by the ambient atmosphere impregnated with the foul substances, may pro-

It is now, I believe, very generally admitted that the laws of contagion can only operate when the disease thus communicated is the product of an *animal* poison; and it is also, in my judgment, clearly established, that puerperal fever is rightfully classed among the zymotic diseases, or those whose existence depends on the presence of a noxious animal material. Since the publication of Dr. Arneth's paper, German physicians have made experiments on animals, which have given the following results: 1st. Any kind of putrefied animal matter introduced into the vagina of a parturient female may engender a malady bearing a strong resemblance to puerperal fever, and frequently followed by death; 2d. A very small quantity of the fluid in the vagina of a woman or of an animal, attacked with puerperal fever, being introduced into the vagina of a parturient animal causes puerperal fever, or at least a disease very much like it.

With the above results, it might very consistently be asked, why every woman after parturition, is not affected with puerperal fever; it would, at first view, seem that this should be so, for there is in more or less quantity, putrefied animal matter in the uterus or vagina of every recently delivered female. Let us, for a moment, pause, and examine this point. In the first place, it seems quite

duce puerperal fever. Mere washing of the hands with soap and water is not sufficient, and Dr. S. has found it necessary to make use of a solution of chloride of lime. In the course of the month of May, 1847, it was arranged that no one should examine any woman in the clinic without previously having washed his hands with the solution, and made use of a nail-brush. Even in June, it was impossible not to remark the influence of this precaution. Out of more than three hundred women confined in that month, only six died; in July, three out of about the same number; in August, three; in September, twelve; October, eleven; November, eleven; December, eight; whereas in April, fifty-seven, and in May thirty-six cases had ended fatally. In the year 1848, the mortality among the puerperal women delivered by male pupils was one in eighty-four; while in the second clinic, among the women delivered by midwives, it was one in seventy-six. Since the year 1827, the rate of mortality in the hospital had never been so diminished. Analogous results have been obtained by the same means at Kiel.

According to the reports of the lying-in houses in the whole Empire of Austria, in none of those institutions in which midwives have been the only pupils has puerperal fever made its appearance as an epidemic; but it prevailed obstinately in Pavia, where they were in the habit of dissecting (in one of the rooms of the lying-in hospital) bodies of the children who died in the hospital.

While in search of the true cause of the prevalence of puerperal fever, and before the necessity of washing the hands with chloride of lime was appreciated, a pregnant woman was admitted into the hospital affected with cancer of the uterus. As several days elapsed before her confinement, and as the case was highly interesting, all were anxious to examine her. The consequence was most deplorable. Fourteen mothers who had been confined at the same time with this woman, and who had been examined by the same students, exhibited symptoms of puerperal fever, and three of them died, although the disease had not been prevailing immediately before, nor did any other case occur except these fourteen. [Braithwaite's Retrospect, part 23d, p. 492.]

certain that the mere contact of putrefied material with the walls of the cavities of the female genitals is not sufficient for the absorption of the deleterious principles; and secondly, there must be some openings in the blood-vessels, through which the matter will pass into the blood, and thence be conveyed to the general circulation. Therefore, even if exposed to her own decomposed matter, or matter from dead bodies, the consequent development of puerperal fever will depend upon the condition that there are openings of some of the blood-vessels through which resorption may be accomplished.

An interesting question now arises—Is a woman, with the conditions named, more liable to contract puerperal fever from the passage into the blood of her own decayed matter, or of matter transferred to her from another female, or from any dead body? The solution of the inquiry will not be difficult with the two following propositions, which I believe have the sanction of science: 1st. The matter found in dead bodies is more putrefied, and, therefore, more poisonous, than that contained in the uterus and vagina; 2d. It is well known that we become accustomed to poisons generated or having long existed in our own system, or produced from decomposed substances coming from our own body. In proof, we may invoke what has been established in regard to syphilization; we may also refer to vaccine, and to an interesting fact connected with the fibrin of the blood. As to syphilization—If an individual had for some time a venereal ulcer, so that the system has become impregnated, the pus of this ulcer cannot, under inoculation, produce a similar one in that individual, but let the pus be infused into the system of another, and the result will be the appearance of a syphilitic ulcer. In vaccination, when the body has become charged with the virus of vaccine, this virus will fail to produce its primitive effects under a second inoculation. In regard to the fibrin of the blood—it is proved that the blood of an animal of one species will generally act as a poison on an animal of another species; and this is on account of the fibrin of the blood, according to Dieffenbach, Bischoff, and Dr. Brown-Séquard, who have shown that no poisonous element exists in defibrinated blood. It would seem, therefore, to follow that the poisonous power of fibrin, or of a substance eliminated with it during defibrinization, varies in different animals, and that each species is accustomed to the poison contained in its own blood, but is intolerant of the action of the poison in the blood of another species.

It may here be remarked that it is the duty of the medical man, when in attendance on women attacked with puerperal fever, no matter what his views may be as to the contagiousness of the disease, to use every precaution against the possibility of translating the affection through his own person. In this precaution nothing will be lost, and much may be gained.

Causes.—It is not easy to assign any special class of influences or causes capable of producing puerperal fever, for in this affection, as in epidemic diseases generally, there has always existed an intangible something, which has not failed to embarrass scientific investigation. There are, however, certain influences which are generally admitted to predispose to the disease—and among them may be mentioned the following: mental emotions of a depressing nature, difficult and protracted labors, yet I have known puerperal fever to follow very rapid deliveries; women with their first children are more liable to the affection than those who have borne one or more; cold and humid seasons seem to favor the development of the disease, although, in some instances, very destructive epidemics have prevailed in the warm months;* inadequate nourishment, a neglect of the laws of hygiene, an impure atmosphere, etc., are so many causes, which may be enumerated as predisposing to the malady. In one word, all influences which, from their depressing tendency, are calculated to lower the forces of the economy may be regarded as predisposing more or less to the disease.

Symptoms.—In order that there may be no confusion in reference to the usual symptoms of this affection, and as there is some difference in those of the two varieties—the *sporadic* and *epidemic*—I shall first direct attention to the symptoms indicative of the sporadic form of the disease. Here, I would wish to impress on you the recollection of the important fact that, as a general rule, before there is the slightest shade of suspicion that puerperal fever is at hand, the very first abnormal condition of the patient will be an accelerated pulse; be vigilant, therefore, when the pulse becomes quickened after delivery; for although it may not be followed by peritonitis, yet it portends no good. The disease ordinarily commences its development from thirty to forty-eight hours after parturition; next to the quickened pulse, one of the earliest phenomena—it is a very rare exception for it not to precede the other symptoms—will be a rigor, of more or less force, and it may be partial or general. Succeeding the rigor, will be exquisite tenderness over the abdominal surface, involving a section, or a large portion of that region; following the chill, there will be a heated and dry skin, and an increase in the rapidity of the pulse, ranging from 120 to 160, and upward. There is nothing uniform in the appearance of the tongue; sometimes dry and extremely red; again, it is coated and

* The researches of M. Laserre give the annexed results: In 27 epidemics in the Maternité de Paris, from 1830 to 1841, 16 occurred during the months of Jan., Feb., March, Oct., Nov., and Dec. Of the whole number of labors in the same institution within the same period, from 1830 to 1841, he presents the following tables: In 18,108 accouchements during the six cold months, there were 868 deaths, or 1 in 20; while in 15,986 accouchements during the six warm months there were 465 deaths, or 1 in 34. [*Recherches Cliniques sur la fièvre puerperale.*]

slimy; distressing thirst is one of the ordinary accompaniments of this disease; the respiration is rapid and short. Nausea and vomiting not unfrequently ensue; the lochial discharge usually becomes suppressed, as also the milk secretion; but these in some cases will go on without interruption. Although the skin is generally dry and hot at first, as the disease advances it becomes moist and clammy. There is a notable change in the countenance—it is expressive of great anguish, and sunken, with a circumscribed lividity around the eyes. The bowels are confined at first, but afterwards diarrhoea not unfrequently sets in; the urinary secretion is high-coloured and defective in quantity. There is, in the progress of the affection, a marked distension of the abdomen—and this may arise from a flatulent condition of the intestines, or from a sero-purulent effusion which is one of the ordinary attendants on the disease, more especially when it proves fatal. Commonly, when the effusion takes place there is a cessation of pain, which oftentimes deludes the friends into false hope; for, under the circumstances, the absence of pain is but one of the preludes to death—the other fatal symptoms consisting in the extreme rapidity of the pulse, which becomes weaker and fluttering, with cold extremities; the patient lapses into unconsciousness; there is a low unintelligible muttering, together with subsultus tendinum; the tongue is parched and exhibits a brownish color, with vomiting of a dark offensive nature. These are the closing phenomena, and are soon followed by death.

There is one striking peculiarity as to the position of the patient in this affection, and I regard it as quite characteristic—the patient remains on her back, with her knees drawn up, and she assumes this position for the reason that she seeks, as it were instinctively, to relieve the abdomen from pressure, the slightest adding greatly to her distress. This attitude not only relaxes the abdominal walls, but in a measure protects the patient from the weight of the bed-clothes. On the other hand, a spontaneous change of position on the side, for instance, should be hailed as a most favorable indication.

In the epidemic form of the disorder the symptoms are somewhat modified; as a general rule there is increased rapidity of the pulse; and from the violence of the poison, a depressed condition of the forces is noticeable at the very invasion of the malady; the distension of the abdomen is much earlier developed, and the disease is more rapidly fatal, sometimes destroying the patient in twenty-four or thirty hours. In some instances, it is worthy of remark that there is an absence of pain on pressure, although the subsequent autopsy may disclose the existence of peritonitis.

Lesions.—There is nothing uniform in the anatomical lesions accompanying this affection, although it may be stated that evidence of peritoneal inflammation is the most constantly met with,

and it is no doubt for this reason that the disease has received the designation of *puerperal peritonitis*. When this lesion is observed it will be found almost always that the peritonitis is general, and not limited to one portion of the membrane; the sac will usually contain more or less sero-purulent effusion; and in this particular there is a marked difference between simple and puerperal peritonitis—in the former there are adhesions through pseudo-membranous formations, because in simple peritoneal inflammation, instead of a sero-purulent affection there is the presence of plastic lymph, the tendency of which is to produce these adhesions. In the uterus and its appendages there will also be exhibited various changes; uterine phlebitis is among the most uniform attendants upon the disease; the abdominal viscera undergo morbid changes, exhibiting more or less abundantly purulent collections, and these collections will sometimes involve the various articulations. There is one peculiar feature usually characterizing the pathology of puerperal fever—it is a *softening* of the tissues, and this will oftentimes be observed in the structures of the uterus, ovaries, peritoneal covering, liver, spleen, and other organs.

In some instances there is no cognizable alteration of the peritoneum, and strange to say M. Charrier* records the history of an epidemic puerperal fever in which lesions of the pleura were substituted for those of the peritoneal sac.

It is worthy of note that sometimes in its severest forms, and when most rapidly fatal, the only apparent changes are those exhibited by the blood; but in what these changes actually consist it is not so easy to determine. It is darker, and loses much of its coagulable properties. According to Prof. Vogel,† it contains lactic acid, sometimes carbonate of ammonia, and again hydro-sulphate of ammonia, its globules do not redden on exposure to the atmosphere, and, therefore, the act of respiration is defective; the globules are in part decomposed, and dissolved in the serum.

Diagnosis.—Where puerperal fever prevails as an epidemic, there can be no embarrassment in the diagnosis; the lines of the affection are so well defined that the observant physician will readily appreciate its existence. Not so, however, in the sporadic form of the disorder; for here it may be mistaken for metritis, but this is of no material consequence, as the therapeutic management in either case would be the same. It may, however, be stated that in metritis the pain on pressure is more circumscribed, and the volume of the uterus itself much increased, the patient bearing pressure well until some portion of the organ is touched; whereas in peritonitis, the affected surface being more diffused, pressure on almost any point of the abdominal region would be followed by

* De la fièvre puerpérale, épidémie en 1854.

† Virchow.

more or less suffering. You are not to understand that pain in peritonitis is simply the offspring of pressure by the hand; on the contrary, the patient without either change of position or pressure will experience much agony, which at intervals will be increased by the passage of flatus from one portion to another of the intestine. There is some tact required in the manual exploration—too much force should not be used, for this, without any compensating good, only aggravates the condition of the patient. Let the medical man keep his eyes, as he cautiously presses the abdomen, on the countenance of the invalid, and he will quickly discover whether or not he inflicts suffering.

When speaking of the attentions needed by the recently delivered woman, the general phenomena of *after-pains* were fully discussed, so that by reference to what was then said it would be an act of unpardonable carelessness to mistake them for peritonitis. It is barely possible that some confusion might exist in discriminating between puerperal inflammation and *tympanites intestinalis*, which not unfrequently follows child-birth, and which has already been mentioned as one of the ordinary accompaniments of puerperal fever. In simple *tympanites*, however, the pulse will be but slightly accelerated; no sunken, dejected condition of the countenance; and *gentle pressure with frictions* will *diminish* the pain. Tympanites, also, may be distinguished from effusion by percussion; the former, tympanites, revealing a resonant sound, while the latter, effusion, would disclose the evidences of fluctuation.

Prognosis.—It need scarcely be remarked, after what has been said touching the nature of the disease, that epidemic puerperal fever is one of the most fatal disorders of the lying-in room; our prognosis, therefore, should always be guarded, and no false hopes encouraged. Even in its sporadic type, the malady, although much less fatal, is full of danger. During the progress of the malady, the experienced observer will be enabled to foresee with prophetic truth its fatal termination by the presence of certain significant indications. I have, as has already been remarked, an abiding faith in the pulse; if it should not exceed 120 beats in the minute, this may be regarded as most favorable; but how different if it reach, and continue at that rate, from 140 to 160! A cessation of pain, without any diminution in the throes of the heart, accompanied with an anxious and drawn countenance—*facies hippocratica*; an oppressed respiration, showing imperfect decarbonization of the blood; involuntary intestinal discharges, the cadaveric odor, &c., may justly be regarded as the precursors of dissolution.

Treatment.—The treatment of puerperal fever may very appropriately be divided into *prophylactic* and *remedial*.

Prophylactic Treatment.—In a disease so fearfully destructive, it can require no argument to show the vital importance of pre-

ventive measures, if these can be proved to arrest the development of the malady. Without referring to other proofs, I shall content myself with alluding to the remarkable results obtained in the Dublin Lying-in Hospital, under the mastership of Dr. Collins. For the four years previous to the adoption of his sanitary measures, the entire relative number of deaths in the hospital during the prevalence of puerperal fever, was 1 in 52; but from 1829 to 1833, under the system of purification, the disease almost entirely disappeared, and the mortality diminished to 1 in 190, 181, 187, 178, the average deaths in the aggregate being 1 in 184 cases. His preventive measures were as follows: The wards of the hospital were closed, during the process of purification, against the admission of patients; they were then filled, in rotation, with chlorine gas in a very condensed form, for the space of forty-eight hours, during which time the windows, doors, and fire-places were kept shut, so as to prevent, as much as possible, the escape of the gas. The floors and wood-work were covered with the chloride of lime, mixed with water to the consistence of cream, which was not removed for forty-eight hours or more. The wood-work was then painted, and the walls and ceilings washed with fresh lime; the blankets, &c. scoured, and stoved in a temperature from 120° to 130°. In addition, the strictest attention was always paid to the proper ventilation of the wards. The beds were composed of straw, and never used a second time without washing the covers, and a renewal of the straw. Dr. Collins states that from the time of the adoption of this mode of purification until the termination of his mastership in 1833, not one patient died of puerperal fever.* The above results are not without interest, and they would seem very broadly to indicate the efficacy of chlorine as an element in destroying the poison of the disease.

Dr. Collins further remarks that, in every instance of the death of a patient, if the most remote symptoms of *fever* had been present, besides scouring every article connected with the bedding, the wood-work and floor was washed with a solution of chloride of lime, and the entire ward whitewashed. This was readily effected, as the sick were invariably placed in a small ward, apart from the healthy. To this latter precaution, he observes, too much attention cannot be paid, as the *instant* separation is of vast importance to both.

The suggestion of Dr. Collins in reference to the *separation* of the sick from the healthy is, in my opinion, a *sine quâ non* to the arrest of epidemic puerperal fever as it prevails in hospital practice. In the crowded wards of the hospital, the poison becomes concentrated, and this circumstance, I believe, is one of the chief reasons

* Practical Treatise on Midwifery, p. 388.

of the fearful spread of the affection in lying-in establishments. Here, then, is a subject worthy the attention of the philanthropist—let the laws of hygiene in reference to the health of the numerous poor, who seek shelter in our public institutions at the time of their accouchement, receive merited attention—let these laws be rigidly and humanely enforced, and the fearful outlet to life, through epidemic puerperal fever, will be measurably closed. We are firm in our conviction, that if the poor were attended at their own homes—defective as they may be in ordinary comforts—instead of being exposed to the infection of crowded wards, the bills of mortality would be greatly diminished. There is a wonderful charm in pure air in all cases of disease, but more especially as regards convalescence from the puerperal state.

Although puerperal epidemic fever usually exhibits its most devastating effects in lying-in hospitals, yet it should be known that these disastrous results are not always confined to this class of asylums. In 1819, the epidemic prevailed at the same time in Vienna, Prague, Dresden, Wurtzbourg, Bamberg, in several small cities of Italy, at Lyons, Paris, Dublin, Glasgow, Stockholm, and Petersburg. It is also very remarkable that the epidemic has extended even to the females of some of the domestic animals—to sluts, for example, in the disease observed in London in 1787 and 1788; and to cows during the epidemic which occurred in several parts of Scotland in 1821.*

Remedial Treatment.†—In regard to the remedial management of the disease, much difference of sentiment has existed, and the discrepancy is mainly due to the conflicting opinions which have prevailed touching the pathology of the disorder. On the one hand, we are directed to depend on prompt and full depletory measures—while, again, the stimulating method is considered as presenting the only hope. There is too much generalization in this kind of therapeutics, and neither the one nor the other plan can be resorted to without a proper discrimination. Let it be carefully treasured in memory, that there is no specific for this disease. In my judgment, the treatment of puerperal fever should not be restricted to the opinions of the respective schoolmen, but, as in other pathological conditions of the system, we should be governed by the special indications which may exist at the time. The lancet, and other of the antiphlogistic agents, are oftentimes necessary in pneumonia, erysipelas, &c., but there are numerous cases in which

* Danyau, Bulletin de l'Académie de Médecine, t. xxiii. Paris, 1838.

† There is one point in the treatment, not only of puerperal fever, but, as a rule, of all puerperal diseases, which should claim in a special manner the attention of the accoucheur, and it is to forbid the patient suckling her child. This duty, so natural and obligatory under ordinary circumstances, cannot be discharged with impunity while laboring under affections incident to the puerperal state.

these measures would prove quickly fatal; the same remark applies to puerperal fever, and this imposes the importance of discussing the question of treatment in reference to the particular form of the disease which may present itself. We have, even in its epidemic garb, what may be termed inflammatory puerperal fever; and, again, the disorder will exhibit itself with all the phenomena of depression, simulating, at the very inception, the type of a low typhoid affection. If this be so—and its demonstration will be clearly recognised at the bedside—it follows as a fundamental principle in therapeutics that the treatment of the two grades of the malady cannot be identical. In *inflammatory* puerperal fever—the nature of which will be defined by the symptoms—prompt depletory measures are certainly indicated. But, in order that these measures may result in benefit, remember that they are to be resorted to *opportunistically*—the blow is to be struck simultaneously with the advent of the enemy—no delay can be tolerated here, and the only hope of rescue is in the sudden arrest of the disease. Therefore, the prompt abstraction of blood is called for; take from the arm from twelve to thirty ounces of blood, depending of course on the urgency of the case, and in order that there may be nothing equivocal in the impression made on the system, bleed from a large orifice, let there be a bold and full stream; in one word, *make your patient faint*; syncope will more readily be accomplished by placing the patient in the sitting position during the abstraction of blood. Is the bleeding to be repeated? Yes, if the indications justify it. But the repetition must not be delayed. Not more than three or four hours should elapse; at this time, one, two, or more dozen leeches may be applied to the abdomen, resting with the judgment of the practitioner, and the bleeding promoted by warm fomentations.

The next indication will be a free action on the bowels; in order that there may be no unnecessary delay in the effect of the medicine, give immediately the good old searching compound:

R. Submur. Hydrarg. gr. x.
 Pulv. Jalapæ gr. xv.
 “ Antimonial. gr. ij.
 M.

Let this be followed in two hours with the annexed draught:

R. Sulphat. Magnesie 3 ij.
 Infus. Sennæ f. 3 iv.
 Mannæ 3 i.
 Tinct. Jalapæ f. 3 i.
 M.

If free purgation be not accomplished, I should have recourse to Croton oil, which is a favorite remedy with me in these cases; it

acts promptly and thoroughly, producing full serous discharges; it stimulates the intestinal mucous surface, thus causing a powerful derivative influence, which necessarily diminishes the engorged condition of the vessels of the inflamed peritoneum.

R. Olei Tiglii gtt. iv.
 Sacchar. Alb. 3 ii.
 Mucil. Acaciæ ℥ 3 ij.
 M.

A teaspoonful every half hour until free catharsis follows.

When the bowels have been properly evacuated, it is essential to attend to that important emunctory—the skin; and with the combined view of diaphoretic action, and calming nervous irritability, one of the following powders may be administered every two or three hours:

R. Pulv. Doveri gr. xxiv.
 “ Ipecac gr. vi.
 Divide in chartulas xij.

The diet should consist, until the inflammatory stage has subsided, rigidly of diluents; a free use of the nitrate of potash, either in gruel or water, will be found of advantage—say gr. xij. of the potash to a tumbler of the fluid, three or four times a day.

We have an important adjuvant in blisters, after the intensity of the disease is somewhat broken; instead, however, of placing them on the abdomen, I greatly prefer applying them on the internal surface of the thighs, immediately over the femoral arteries. Order one or two blisters, as the indication may be, each 4 inches by 6; keep up a free discharge by means of the epispastic ointment, and oftentimes the best results will ensue.

I have said nothing of the specific influence of mercury in this disease. Except as a purgative at the commencement, I have but little faith in the remedy. I have seen repeated instances of the entire failure of any benefit from ptyalism, whether the mercury be administered internally or through inunction.

Much has been said in commendation of the internal use of turpentine. It has been highly extolled by Dr. Brennan, of Dublin, and many able practitioners have endorsed his views. There can be no doubt of the efficacy of this medicine in relieving the tympanites, which is so usual an accompaniment of the affection. Half an ounce of the turpentine, with the same quantity of castor oil, every six or eight hours, will be found often effective in removing the intestinal flatus; and frequently it will mitigate the intensity of the pain as a counter-irritant to the abdomen. I may here remark that, in cases of severe tympanites intestinalis, I have found much benefit in large enemata of tepid water. It is needless to

observe that, as soon as the disease has yielded to the remedies, the recuperative powers of the system are to be aided by stimulants, tonics, and nutritious diet.

In the adynamic form of the disease—that form characterized at the very commencement by a sinking of the forces, depletion is not to be attempted. Here, the vital forces, as far as may be, should be maintained. Stimulants, nutriment, and pure air are very unequivocally indicated. But, alas! how often are our best-directed efforts made negative by the inexorable demands of the merciless foe. The sulphate of quinine, although by no means a new suggestion, has recently found favor in the hands of M. Beau, at the Hôpital Cochin, Paris. He administers it in large doses, preceding its employment by an evacuation of the bowels. M. Beau states that the efficacy of the remedy consists in giving it to an extent to produce head-troubles, such as vertigo, deafness, &c., and these results should be continued for several days.*

I should not here neglect to speak of the *opium* treatment, both in the sthenic and ataxic varieties of the disease, more especially when lesion of the peritoneal covering exists. As far as I know, the administration of large doses of opium in peritonitis, altogether unconnected with child-bearing, was first introduced to the attention of the profession by that eminently practical clinical teacher, Dr. Graves, of Dublin. The first time he resorted to this remedy in peritoneal inflammation was in 1822; it was the case of a woman in whom the inflammation set in after the operation of tapping for dropsy. Dr. Graves says, “the case seemed so hopeless, and the agony the patient was suffering so intense, that I was induced to order opium for her in very large doses; she also got wine; to my great astonishment she recovered.”† Dr. Stokes, another of Dublin’s eminent practitioners, subsequently employed opium in that most perilous form of peritoneal inflammation springing from *perforation*—in one case which recovered, he gave 105 grains in addition to what had been administered by injection.‡

Prof. Alonzo Clark, of the College of Physicians and Surgeons of this city, has employed opium in heroic doses during the prevalence of puerperal fever at the Bellevue Hospital, and with good success.§

* Bulletin de l’Académie de Médecine, t. xxi. p. 81.

† For the conjoined experience of Drs. Graves and Stokes on this point, I refer the reader to the fifth volume of the Dublin Hospital Reports.

‡ Clinical Lectures on the Practice of Medicine. Vol. ii., p. 244.

§ Some interesting details furnished by Prof. Keating, the able annotator of Dr. Ramsbotham, touching Dr. Clark’s experience with opium in puerperal fever, will be found in Ramsbotham’s System of Obstetrics, p. 534. I may here, however, be permitted to quote the following as an evidence of the extraordinary extent to which opium may be administered without fatal results. Prof. Clark says: “Regarding the tolerance of opiates in some of these cases—at the risk of being charged with

It is an interesting fact that when opium is administered in these cases so as to produce incipient narcotism, the respiration becomes sensibly affected. Dr. Clark, with the respiratory movement reduced to 12, and, as a general rule, the pulse below 100, with the concurrence of other favorable symptoms, such as a subsidence of the pain and tenderness, with diminution of the tympanites, gradually lessens the quantity of the drug, and finally discontinues it.

Prof. Fordyce Barker speaks highly of the *veratrum viride* as a remedy in puerperal fever; it certainly exercises a marked control over the frequency of the pulse, and he observes, "in no disease have I seen its value more strikingly exhibited."* It requires extreme caution, and should not be employed except under circumstances in which the most unceasing vigilance as to its administration and effects can be exercised.

rashness and trifling with human life—I will make some extracts from case seven. The treatment was commenced at 10 A.M., on 26th of Dec, two grains of opium hourly. A 2 P.M., no change in the symptoms, dose increased to gr. iv.; at 3 gr. iv.; at 4, gr. v.; at 5, gr. v.; at 6, gr. viii.; at 8, gr. x.; at 9, gr. xij.; at 11, sol morph. sulph. (16 gr. to f 3 i) 3 iss.; at 12, 3 i.; at 1½ A.M. (respiration 6), 0; at 6 A.M., (respiration 12), opium gr. xij.; at 10, sol 3 i.; at 12 M., opium gr. xij.; at 1½ P.M., sol. 3 ij.; at 2½, 3 ij.; at 3½ opium, opium gr. xxiv.; at 5, gr. xij.; at 6½, sol. 3 ijss.; at 7½, 3 ij.; at 9, opium gr. xiv.; at 10, gr. xvj.; at 11, gr. xvij.; 28th, at 1 A.M., sol. 3 ijss.; at 2, 3 iv.; at 3½, opium gr. xx; at 4, sol. 3 ijss.; at 5, 3 iii.; at 6, 3 ijss.; at 6½, opium gr. x.; at 7, sol. 3 ijss.; at 8, opium gr. xxij.; at 9, sol. 3 iv.; at 10, 3 iij.; at 11½, 3 iij.; at 12, 0. Thus this woman took, in the first 26 hours of her treatment, opium lxviiij. and sulph. morph. gr. vij.; or counting one grain of sulph. morph. as four grains of opium, one hundred and six (106) grains of opium. In the second 24 hours, she took opium gr. cxlviii., and sulph. morph. lxxxj., or opium four hundred and seventy-two (472) grains! On the third day, she took 236 grains; on the fourth, 120 grains; on the fifth, 54 grains; on the sixth, 22 grains; on the seventh, 8 grains; after which, the treatment was wholly suspended. This woman was not addicted to drinking, and, after her recovery, she assured me repeatedly that she did not know opium by sight, and had never taken it, or any of its preparations, unless it had been prescribed by a physician. This is, perhaps, 'horrible dosing,' and only justifiable as an experiment on a desperate disease; yet, this woman is alive to tell her own story, as are several others, who took surprising quantities of this drug. But later observations have shown that the tenth to the thirtieth part of this maximum is sufficient in controlling the disease."

* Remarks on puerperal fever, New York Academy of Medicine, Oct. 1857.

LECTURE XLV.

Puerperal Mania; its Pathology—Is it a Phrenitis, or is it essentially a Disease of Exhaustion and Irritation?—Opinions divided; Necroscopical Researches—At what Period of the Puerperal State is Mania most apt to Occur?—Esquirol's Statistics—Frequency of the Disease—Is Puerperal Mania liable to recur in a Subsequent Birth?—The Opinion of Dr. Gooch and others on this Point—Causes of Puerperal Mania—Predisposing and Exciting; Hereditary Influence—Symptoms—Rapid Pulse and Continued Restlessness—What do they Portend?—Diagnosis—Puerperal Mania and Phrenitis, Distinction between—Prognosis—Records of Hospitals for the Insane; Records of Private Practice—Duration of Puerperal Mania—Is Permanent Aberration of Mind Probable in this Disease?—Treatment—Marshall Hall and Blood-letting—Opiates—Their Importance—Moral Treatment.

GENTLEMEN—Puerperal Mania will occupy our attention to-day; it is one of those affections incident to the puerperal woman, which always to a greater or less extent has its melancholy surroundings. Imagine, for instance, a young mother, who has a few days since given birth to a child, to be suddenly deprived of her reason! Her mind has surrendered to the encroachments of morbid action, she is no longer cognizant of events as they pass, and is thus cut off from the inexpressible pleasure not only of intelligently gazing upon, but of ministering to, the wants of her new-born infant, whose very condition of dependence makes it an object of additional interest. Indeed, the affection very naturally throws a gloom over the household, and is a subject well worthy the attention of the medical man.

This malady may manifest itself during gestation, at the time of labor, or some days subsequently; again, it may become developed during the progress of lactation, or it may follow weaning. Instances have been recorded of its having occurred in very sensitive women immediately after conception.

Pathology of the Disease.—There is no general agreement as to the pathology of this disease. By some it is supposed to be an inflammation of the brain and its membranes—a veritable phrenitis; while others maintain that it is a disease more or less of exhaustion and intestinal irritation consequent upon the puerperal period. Without attempting to deny that puerperal insanity may, under circumstances, be the result of phrenitis, yet I think accurate clinical observation abundantly proves that, as a general rule, it is connected with a dilapidated condition of the forces. Some of the

most marked cases of melancholia—one of the forms of mania—I have ever witnessed, sprang from the exhaustion of undue lactation. The nervous system of the menstruating, the pregnant, parturient, and nursing female is liable to various modifications—so many concussions, if you please, the tendency of which is to impair to a greater or less extent its equilibrium, and thus dispose it to numerous derangements, one of the phases of which may be mania, or melancholia. I do not mean to be understood that mere exhaustion will necessarily occasion mania; but what I do believe is this, that there is a peculiar specific sensitiveness in the sexual organs of the female during the puerperal period, which, under the influence of debilitating and other exciting causes, may so far affect the integrity of the nervous economy, as to generate certain morbid phenomena—in one case we may have hysteria, in another melancholy, in another convulsive movements, and in another partial or complete loss of reason. It is by no means a rare circumstance for some of these abnormal developments to present themselves during menstruation, in the course of gestation, or at the time of labor, or after the completion of this process. In brief, I believe that, as a general rule, puerperal mania is a *sui generis* insanity, and its peculiarity is traceable to certain agencies acting on the sexual system, and the subsequent re-action of this system on the nervous mass.

It is quite probable that the discrepancy of opinion in regard to the pathology of the disease may have arisen from a want of proper discrimination in the results of necroscopical researches—for instance, it is well shown by these researches that, in what may be designated general insanity, evidences of inflammation of the brain and its membranes, may be regarded as the rule. But, according to the best observers, among whom may be mentioned Esquirol,* such is not the fact in the examination of those, who have died of puerperal mania.

At what Period of the Puerperal State is Mania most apt to Occur?—Although puerperal mania will occasionally exhibit itself during pregnancy, and after weaning, yet it is generally conceded that it is most liable to become developed a few days after delivery, and in the progress of advanced lactation. The following tables by Esquirol are not without interest: In 1811, 1812, 1813, 1814, there were eleven hundred and nineteen insane women admitted into the Salpêtrière, of whom ninety-two were affected with puerperal insanity; of these, 16 were attacked from the first to the fourth day after delivery; 21 from the fifth to the fifteenth day; 17 from the sixteenth to the sixtieth day; 19 from the sixtieth day to the twelfth month of lactation; 19 after weaning.

Frequency of the Disease.—This affection cannot be considered

* Des Maladies Mentales, 1838.

as of rare occurrence. Among seventeen hundred and nineteen cases of insane women in the Salpêtrière, there were 52 cases of puerperal mania, and Dr. Haslam reports 84 cases among 1644 women admitted at Bethlem.

Is Puerperal Mania Liable to Recur in a Subsequent Birth.—This is certainly an interesting inquiry—for when a female has once suffered from this affection, nothing can be more natural than that the husband and friends should be solicitous as to the probability of its recurrence in a future parturition. One of the most practical writers on the disease under consideration, Dr. Gooch, is quite emphatic on this point. He says: “I have attended many patients, who came to London to be confined because they had been deranged after their former lying-in in the country; except in one instance, not one of the patients had a return of their disease!”* Such, too, is the tendency of the testimony presented by other eminent observers. I must confess it is adverse to my own personal experience. I once attended the wife of a clergyman from the South in her third labor; she had previously borne two living children, and in each of her confinements had been attacked with puerperal mania. The labor in which I attended her was in all respects favorable, but in defiance of every caution, on the fifth day after delivery puerperal insanity set in.† I have a patient in this city, whom I have confined five times. In the two first confinements nothing remarkable occurred. In the third, two days after the birth of her child, her husband was compelled to absent himself on urgent business; thirty-six hours after his departure, she lost her reason, and had a tedious convalescence of ten months. Twenty months from the period of her recovery she was again confined; and mania was again developed. In her fifth parturition she suffered no mental aberration. I could cite two other cases, which have occurred to me in consultation, one with Dr. White of this city, the other‡ with Dr. Brown, of Little Falls, in which both patients became affected with puerperal mania in two consecutive deliveries. It may be that these cases will be regarded as coincidences, and do not bear the relation of cause and effect. However this may be, it seems to me that with the predisposition necessarily induced by a previous attack, together with the constant dread of a recurrence of the malady, the nervous system will be so agitated as to render it not at all improbable that mania having once become developed will be liable to exhibit itself at subsequent periods. Under the circumstances, it would at least be judicious to maintain

* Most Important Diseases of Women, p. 120.

† Hereditary influence no doubt had its sway in this instance, for both the father and the paternal uncle of the lady died maniacs.

‡ In this case, too, there was hereditary predisposition, for the mother of the patient had suffered from puerperal mania soon after the birth of her only child.

a guarded opinion, and at the same time to exercise a safe measure of vigilance against the operation of all exciting influences.

Causes.—These may be divided into the predisposing and exciting. Among the former, may be placed prominently hereditary influence;* a delicately organized nervous system keenly alive to moral and physical impressions; unusual sensibility of the sexual organs; and, in my opinion, a previous attack is entitled to be ranked among the predisposing causes of the affection. The exciting causes may be sudden mental emotions, whether of a depressing or elevating character; disordered digestion; disease of the uterus, or other of the genitalia; exhaustion from undue lactation, or from hemorrhage, through the changes produced in the nervous system. Weaning is regarded by some writers as an excitant to puerperal mania, but I do not think it entitled to much prominence; if it were so, the disease would assuredly be apt to develop itself frequently in women who, from want of proper feeling or other circumstances, do not suckle their children; this, however, is shown not to be the case. I am disposed to think that some of the instances of mania, which have been referred to weaning, are due to the exhaustion consequent upon protracted lactation rendering the weaning a necessity.

Symptoms.—The symptoms indicative of puerperal mania have no special identity, and are subject to variations. Indeed, a very practical division of the disorder has been made into what is denominated mania and melancholia, each characterized more or less by symptoms differing from each other. Mania ordinarily occurs soon after delivery, while melancholia is more liable to manifest itself as the result of the exhaustion of undue lactation. In mania, there are usually all the indications of agitation and excitement—great irritability of temper—suspicion is a common symptom; sometimes there will be marked obstinacy and moroseness; the husband and infant become objects not only of indifference, but of actual dislike; there may or may not be febrile excitement; the pulse is sometimes unchanged—and again, it is rapid with more or less fever. The patient will occasionally become extremely violent both in manner and language, and much vigilance required to prevent her inflicting injury upon herself or child. A very uniform and early symptom is restlessness soon after delivery—an inability to sleep—the patient is wakeful, throwing herself about the bed, and sometimes sighing. This state of watchfulness, I cannot too emphatically remark, should always be regarded with apprehension, and as far as may be, means promptly employed to procure sleep. Usually the digestive functions are much disturbed, as indicated by the coated, slimy tongue, irregularity of the bowels, defective urinary

* Dr. Burrows says that if the truth could always be ascertained, more than one half would probably be found to owe their origin to this cause. [Commentaries on Insanity.]

secretion; the patient, although hungry, will sometimes evince an indisposition to eat merely from obstinacy; this latter fact I have noticed on more than one occasion. In the other form of mania—melancholia—the symptoms are somewhat different. Here, in lieu of excitement and violence, there is marked depression of spirits—there is, if I may so term it, a deep melancholy pervading every look and act of the invalid; she is silent, listless, and indifferent to everything passing around her; the pulse is normal, with more or less deranged digestion. In one word, she is an object painful to contemplate, and it is one of those pictures in real life well calculated deeply to impress the observer, and call forth his sympathies.

Diagnosis.—From what has been said of the symptoms and divisions of this disorder, the diagnosis cannot be difficult. The time and circumstances of its occurrence will also aid in facilitating a just opinion. Puerperal mania might possibly be misapprehended for phrenitis, but proper attention would soon reveal the error. In the latter affection, the hard and quickened pulse, the heated surface, the suffused eye, the intolerance of light and noise will very soon tell the story to the vigilant physician.

Prognosis.—Many will be the anxious inquiries as to the probable issue of the disease, and these inquiries will be directed to two points—in the first place, whether the disorder is likely to terminate fatally—and secondly, if not, whether the mind will be permanently affected? I need not dwell on the constancy with which these appeals will be made, and the pressing urgency for a response. It, therefore, is the duty of the practitioner, by a proper appreciation of the statistics of the affection, to be able at least to approximate a truthful decision. It has been well remarked that the data furnished by the records of hospitals for the insane are not proper guides as to the results of this disease under other and more favorable circumstances.* The fact, I think, is well shown by the following reports: in ninety-two cases recorded by Esquirol, fifty-five recovered, six died, and thirty-one incurable, or one in three; Dr. Haslam says, of eighty-five admitted into Bethlem, only fifty recovered, and thirty-five incurable; Dr. Burrows reports fifty-seven cases, of which thirty-five recovered, and eleven incurable; among the thirty-five recoveries, twenty-eight occurred during the first six months.

Private practice, I repeat, presents no such melancholy experi-

* Dr. Gooch very truly observes, that the records of hospitals contain chiefly accounts of cases, which have been admitted because they have been unusually permanent, having already disappointed the hope, which is generally entertained and acted upon, of relief by private cure; the cases of short duration, which last only a few days or weeks, and which prove a large proportion, are totally overlooked or omitted in the inspection of hospital reports.

ence. It is perfectly safe, under ordinary circumstances, to give a favorable opinion as to the termination of the disease, both as regards the restoration of body and mind. I say under ordinary circumstances, for there are occasionally certain conditions of the disorder which portend a fatal result, and it is proper that they should not elude the attention of the practitioner. These conditions are now admitted by the ablest physicians as of great moment in forming an accurate diagnosis—*they are the rapid pulse, and continued restlessness at the very inception of the malady*. When these two phenomena exist conjointly, they are to be regarded as tokens of no good. Happily the great majority of cases are not characterized by the quickened pulse, although watchfulness is a common attendant.

I may here remark that the reason for the apprehension of danger from the rapid action of the heart, and the continued loss of rest, is of easy solution—these two symptoms will of necessity draw largely on the strength of the patient—there is no repair to the debilitated forces, and death, in these cases, may justly be attributed to exhaustion of the system.

Duration of Puerperal Mania.—In most instances, puerperal mania is of short duration, not unfrequently yielding to judicious treatment in a few days or weeks. Sometimes, however, the recovery is protracted, and the loss of reason, more or less complete, will continue for many months. According to the most reliable data on the subject, well sustained by clinical observation, it may be affirmed that the average duration of the malady is from one to six months, while the permanent aberration of mind is the rare exception.

Treatment.—A ripe and experienced judgment is essential to the proper treatment of this disease. The thoughtless practitioner, governed in his therapeutics by mere symptoms, will be extremely apt to commit a grave error in the management of the malady. The excitement and violence of the patient he will probably attribute to vascular fulness, a phlogistic state of system—it may be to phrenitis. With this view of the case, he will of course resort to depletory measures, the first of which will be the free use of the lancet. This is oftentimes a fatal mistake. Puerperal phrenitis, it would be well to remember, is among the very rare occurrences of the lying-in room; and it cannot be too emphatically borne in recollection that puerperal mania is, as a general rule, a disease of exhaustion and irritation. If the practitioner will but keep this cardinal fact before him, he will have the key to the treatment. I was forcibly struck some years since with the remark of that sagacious observer, Dr. Marshall Hall—he says, “On being called to a case of puerperal mania, I have long been in the habit of asking whether the patient has or has not been bled; on this greatly de-

pende the result of the case; if blood has been freely taken, the patient will probably die; if otherwise, most puerperal cases of mania issue well." If this language of the distinguished physiologist were incorporated into a maxim, and inscribed upon the tablets of memory, well, indeed, would it be for the invalid attacked with puerperal insanity.

If what has been said be true—that puerperal mania is most commonly a disease of exhaustion and irritation, then it would follow as a legitimate consequence that the two broad indications are to repair, as promptly as may be, the waste the system has undergone, and, secondly, to allay the nervous irritability. Let me here ask—what is the most efficient, and, indeed, the only mode of repairing waste under these circumstances? Is it not through proper nutrition? But nutrition is not an exclusive process—it is but one link in a chain of processes. Food taken into the stomach will not necessarily nourish—its nutrient properties will depend upon its being properly digested; and if you wish ingesta to be converted into good blood, one material prerequisite is—that the chylipoietic functions shall be in good condition. I think I may say, without fear of contradiction, that a very uniform attendant upon puerperal mania is a disordered digestion, as is shown by the coated tongue, fœtid breath, loss of appetite, and irregularity of the bowels. Therefore, with such indications, the first thing to do is to administer a cathartic, say gr. vi. submur. hydrag. with gr. xii. pulv. rhei; let this be followed in six hours by castor oil, or the following draught:

℞
 Sulphat. Magnesiae 3 i
 Infus. Sennæ f. 3 iv
 Munnæ 3 i
 Tinct. Jalapæ f. 3 i
 M.

One half this to be taken, and if not effectual, the remaining half in four hours.

In these cases of coated tongue and foul breath, great benefit will sometimes be derived from an emetic of ipecacuanha—gr. x. to gr. xii. in half a tea-cup of warm water.

When the bowels have been properly evacuated, it is most important to quiet the nervous system; if the patient can be early put into a state of repose—if the exhausting and harassing watchfulness be speedily arrested, the best results may be predicted. For this purpose, opiates, in some of their various forms, must be resorted to; but it should be recollected that it is most desirable to make a prompt impression, and, therefore, a full dose should be administered at first, followed subsequently by a smaller quantity as circumstances may indicate. If there be nothing in the idiosyn-

crazy of the invalid to contra-indicate it, a grain or more of solid opium may be given, or thirty or forty drops of the tincture; one half grain or more of morphine will sometimes act admirably; 10 grains of Dover's powder; or the following may be prescribed:

R
Syrup. Papav. f 3 vi
Mucil. Acaciæ f 3 iii
Sol. Sulph. Morphine (M.) gtt. xx.

M.

A table-spoonful every half-hour until sleep is obtained. Hyoscyamus and camphor, five grains of each, was a favorite prescription with Dr. Gooch, especially where opiates could not be tolerated. It can scarcely be necessary to enjoin, that whichever of these remedies may be employed, they should be repeated according to the emergency of the case, and the sound discretion of the physician; nor should they be resorted to if there be heat of system with much thirst. Cooling but gentle aperients, together with diaphoretics, will soon remove these latter symptoms. The spirits of mindererus, a table-spoonful every two or three hours, will be found a suitable diaphoretic for the purpose.

If there be much heat about the head, evaporating lotions to the part will be of service, together with warm water fomentations to the feet; and if there be an approach—as sometimes will be the case—to stupor, blisters behind the ears may be applied with marked good results. The diet to be of easy digestion, and nutritious—and when not contra-indicated, animal food may be allowed freely. On the same principle, also, malt liquors, in proper quantity, will aid in accomplishing the object in view—the building up of the dilapidated forces. In one word, the judicious physician, seeing the indications, and fully appreciating the surroundings of each case as they may present themselves to his observation, must be the judge as to the special manner of adapting his therapeutics.

I have said nothing of the *moral* treatment of puerperal mania; good nursing—by good nursing I mean discreet nursing—has much to do with the recovery. What the patient needs is the exercise of that oftentimes rare commodity in the sick-room—common sense. Above all things, let her be protected from the intrusion of inquisitive and talkative friends. Quietude is what she most needs—great caution should be observed to avoid either in conversation or acts all causes of irritation; the nurse should be reminded that the patient is never to be left alone, for instances have occurred in which females, affected with this disease, have taken advantage of their solitude, and committed acts of personal violence.

One of the material points in the moral treatment of this affection is to exercise a judicious restraint, without permitting the patient to become conscious that there is the slightest surveillance

over her actions. This is the perfection of good nursing. It is important, as she convalesces, to have her mind agreeably occupied in some way most congenial to her tastes—pleasant conversation, drives in the country, music, painting, etc., are all so many resources, which may be advantageously resorted to.

In those examples in which the mind of the patient continues unsettled, accompanied by violence,* rebellious to ordinary restraint, the question will of course arise as to the necessity of removing her to some Institution fitted for this special class of cases. The alternative, however, I should be indisposed to adopt except under the most urgent necessity.

* The soothing influence of ether will oftentimes exhibit itself most beneficially in quieting the violent agitation, occasionally found to accompany this disease.

LECTURE XLVI.

Phlegmasia Dolens, although generally incident to the puerperal state, is not always so—It may develop itself in the non-puerperal woman, and also in the male sex; but little understood by the early Fathers—Mauriceau the first to direct special attention to it—His Views of its Pathology—The Views of Puzos and Levret—Historical Sketch of the Disease—Mr. White, of Manchester—Mr. Frye, of Gloucester—Dr. Ferriar—Mr. Hull—M. Albers—M. Bouillaud—Professor Davis, of London—Dr. Robert Lee—Is Phlegmasia Dolens a Crural Phlebitis?—Dr. Mackenzie, of London—Is Phlegmasia Dolens a Toxæmia?—Synonyms—Causes of the Disease; Symptoms—Why is Edema a Symptom of Phlegmasia Dolens?—Causes of Dropsical Effusion; the relation between the œdema of Phlegmasia Dolens, and Obstructed Venous Circulation—Proof—Are the Veins Absorbents?—Lower's Experiments—Boerhaave; Van Swieten, Hoffman, Morgagni, Cullen—Majendie and Bouillaud—The Edema of Pregnancy—How Explained—Which of the Inferior Extremities is most liable to Phlegmasia Dolens?—The Causes of the Difference—At what Period after Labor does the Disease most usually occur?—Frequency of Phlegmasia Dolens—Statistics—Diagnosis—Prognosis—Progress, Duration, and Termination of the Disease—Complications—What are they?—Purulent Collections—Their Consequences—Peritonitis—Metro-Peritonitis—Treatment of Phlegmasia Dolens—Its Indications—Local Applications with the view of diminishing Pain.

GENTLEMEN—The disease known as *Phlegmasia Dolens* is usually classed among the affections incident to the puerperal state; but, at the same time, it should be recollected that it is not exclusively restricted to this period, for it will occasionally develop itself in the non-puerperal woman; and examples of the disease have even been observed in the male sex. I have looked in vain for a description of this interesting affection among the early Fathers of our science; there is the slightest possible allusion to it by Hippocrates; and if, perhaps, we except Rodericus a Castro,* we have nothing in addition touching it, until the time of Mauriceau, who appears to have been the first to have directed special attention to the disorder. His views, as we shall presently see, of its pathology, are not the views recognised by science in our day; nor did his immediate successors, Puzos, Levret, and others, succeed in throwing any additional light on the true nature of the malady. It must, however, be conceded, that these observers, although their pathology was crude and without a basis, exhibited remarkable cleverness in describing the more prominent symptoms of the disease, nor were their therapeutics of the affection, considering the times in which they lived, less worthy of note.

* 1603.

Historical Sketch of Phlegmasia Dolens.—Mauriceau attributed the origin of the affection to a collection of humors, which should have passed off with the lochial discharge; and he says the legs and thighs become œdematous and greatly swollen, sometimes extending from the groin to the foot; the œdema and enlargement may involve one or both extremities.* Puzos supposed the disease to result from a deposit of milk in the part affected, this deposit commencing in the groin and upper portion of the thigh; the pain experienced by the patient was usually in the direction of the large vessels coursing along the limb.† Levret, who also believed in the milky metastasis, tells us that the swelling caused by this deposit ordinarily terminates in infiltration of the cellular and adipose tissues of the parts affected, and that all these parts become very œdematous.‡

Mr. White,§ of Manchester, in 1784, maintained that the disease was due to an obstruction of the lymphatic vessels of the parts, and that these vessels became obstructed during the process of labor. Mr. Frye, of Gloucester, in an essay published in 1792, taught that the lymphatics at the brim of the pelvis, just under Poupart's ligament, became ruptured, and, as a consequence, there was an escape and diffusion of lymph into the cellular tissue of the limb. Dr. Ferrier, on the contrary, believed that there was neither obstruction nor rupture of the lymphatic vessels, but that the pathology of the disease consisted essentially in inflammation of these vessels and glands. In 1800, Mr. Hull|| advocated the opinion that the proximate cause of the disorder was an inflammation of all the organs

* "J'ai vu plusieurs femmes après être accouchées assez heureusement, avoir les jambes et les cuisses toutes œdemateuses et extraordinairement grosses, quelquefois depuis l'aîne jusques à l'extrémité du pied, par fois d'un seul côté, et d'autres fois de tous les deux. Cet accident survient souvent ensuite d'une douleur sciatique causée par un reflux, qui se fait sur ces parties, des humeurs qui devoient être évacuées par les vindanges, dont le gros nerf de la cuisse s'abreuve quelquefois tellement, qu'il en peut rester à la femme une claudication dans la suite."

[Traité des Maladies des femmes grosses, et de celles qui sont accouchées. Tome premier, p. 446. (1740).]

† "Les dépôts laiteux les plus communs, après ceux des mamelles, sont ceux qui se font sur les extrémités inférieures. Ces dépôts ne se forment guères avant le douzième ou la quatorzième jour de la couche. C'est dans l'aîne et dans la partie supérieure de la cuisse que le dépôt commence à donner des signes de sa présence par la douleur que l'accouchée y ressent; et la douleur suit ordinairement le trajet des gros vaisseaux qui descendent le long de la cuisse." [Traité des Accouchemens, p. 350. (1769).]

‡ "Il est cependant encore plus ordinaire de voir cet engorgement laiteux se terminer aux dépens de l'infiltration du tissu cellulaire qui garnit les interstices des muscles de l'extrémité du même côté, ensuite du tissu graisseux qui est sous la peau de la cuisse, de la jambe, et du pied. Toutes ces parties deviennent alors fort œdemateuses." [L'Art des Accouchemens, p. 177. (1766).]

§ An Inquiry into the Nature and Cause of that Swelling in one or both of the Lower Extremities, which sometimes happens to Lying-in Women.

|| An Essay on Phlegmasia Dolens, by John Hull, M.D., Manchester, 1800.

and tissues of the affected limb, resulting in a profuse pouring out of coagulable lymph; and in this way he explained the tension and swelling, two of the prominent characteristics of the disease. Albers says the nerves are primarily affected—that the pain accompanying the disorder is essentially a neuralgia, and the œdema one of its effects.* It may here be remarked, that the opinion of Albers was, to a certain extent, sustained by Dugès, Siebold, and others, but they did not altogether reject the pathological changes in the other tissues.

So far, we have, I think, what may be appropriately termed mixed opinions as to the true nature of phlegmasia dolens, without much approach to a concurrence of sentiment among the authors cited. In January 1823, however, a new theory was advanced by M. Bouillaud,† who referred the disease to an inflammation and obstruction of the crural veins, and it is well to remark that this explanation is the one now very generally accepted by the profession. It is claimed for M. Bouillaud, that he was the first to point out this pathological condition of the disease; but it seems very satisfactorily demonstrated that the credit really belongs to the late Professor Davis, of London. As early as 1817, he proved by dissection of a fatal case, which had occurred to him, that phlegmasia dolens involved an inflammation of the iliac and femoral veins; the dissection was witnessed by Mr. Lawrence. In May, 1823, Prof. Davis read before the Medical and Chirurgical Society,‡ an interesting paper on the disease. It will, therefore, be seen, that although Dr. Davis's essay did not appear until four months subsequently to the paper of M. Bouillaud, yet he had actually observed in dissection, six years previously, the pathological fact under consideration.

Dr. Robert Lee, of London, concurs in the view that the pathology of the disease is really a crural phlebitis; but, at the same time, he maintains that the inflammation commences in the veins of the uterus.§

It is proper here to state that, in 1826, Mr. Guthrie had suggested the opinion that crural phlebitis was simply an extension of inflammation from the veins of the uterus; and it was not until 1829 that Dr. Lee demonstrated the coincidence of uterine and crural phlebitis. In a more recent paper on this subject he writes thus:¶ “The results of the last twenty-four years' experience confirm my previous observations, and I am satisfied that inflammation

* Hufeland's Journal, p. 16, Feb. 1817.

† De l'oblitération des veines et de son influence sur la formation des hydrop. partiels. Archives générales de méd., Janvier 1823, p. 188, T. 11.

‡ Med. and Chirurg. Trans., vol. xii., 1823.

§ Pathological Researches on Inflammation of the Veins of the Uterus, Medico-Chirurg. Trans., vol. xv., 1829.

¶ Cyclopædia of Pract. Med., 1845, vol. iii., Art. Phlegmas. Dolens, p. 529, et seq.

of the iliac and femoral veins is the proximate cause of the disease, and that, in puerperal women, the inflammation commences in the uterine branches of the hypogastric veins." There is no doubt that Dr. Lee is correct in some cases, and that the crural phlebitis, which results in phlegmasia dolens, does, in certain instances, commence in the veins of the uterus; but that this is not always so is clearly shown by two facts: 1st. Phlegmasia Dolens has been recognised in the puerperal woman under circumstances in which the uterine veins were in no way involved. 2d. There are examples of the disease occurring in which the veins of the lower part of the extremity were alone the seat of inflammation, without the slightest manifestation of disturbance in the vessels of the uterus.

That clever pathologist, Virchow, believes that the incipient morbid condition of the disease consists in the presence of a coagulum in the veins; and that the inflammation of the vessels, the effusion of lymph and purulent secretion, the breaking down of the coagulum and the presence of pus in it, are purely incidental to the occlusion of the veins.

The last special writer on phlegmasia dolens, Dr. T. W. Mackenzie, of London, while admitting that the phlebotic theory of the affection is better sustained by facts than any other, which had preceded it, believes that he has demonstrated the following conclusions at which he has arrived:

"1st. Crural Phlebitis, in a pure and uncomplicated form, cannot give rise to all the local and general phenomena of the disease, and, therefore, cannot be its proximate cause."

"2d. Phlebitis itself is, for the most part, not a primary, but a secondary affection; and, in the great majority of cases, is a consequence of the circulation of impure or morbid blood in the veins."

"3d. The proximate cause of the disease is, therefore, presumably a morbid condition of the blood, which I have experimentally shown to be capable of producing not only the lesions of the veins met with in the disease, but all its other phenomena."*

I have read with much interest the excellent monograph of Dr. Mackenzie, but really I do not see that he has proved anything which all good observers are not willing freely to admit. In the first place, it seems to me that crural phlebitis,† like pneumonia,

* The Pathology and Treatment of Phlegmasia Dolens, etc., 1862.

† It may be remarked, that *phlebitis* which precedes *phlegmasia dolens*, differs in no sensible particular from ordinary phlebotic inflammation. In men, as in women, this latter has been occasioned by carcinoma of the rectum, the introduction of a sound into the bladder, giving rise to inflammation of the veins of the prostate, and thus involving the adjacent venous trunks. An example of this is recorded by Cruveilhier. Valleix mentions two interesting cases of phlebitis caused by the pressure of an ovarian tumor. It is also well established that inflammation of the iliac and femoral veins is not only not peculiar to women recently delivered; but may arise from suppression of the menses, malignant disease of the os and cervix uteri, and from enlargement of the organ from any pathological cause.

pleurisy, or any other inflammation, is, if you please, a product or an effect of some antecedent; it will not, I think, be attempted to be shown that it has a spontaneous origin, and, therefore, it must be rightfully classed among the secondary affections. Again, in maintaining that a "morbid condition of the blood" is the proximate cause of the disease, he says what every experienced obstetrician will readily concede, is often, but not always, the case; or, in other words, that this state of the blood is frequently the starting point of the malady. If we look at the phases through which the puerperal woman passes, we cannot be surprised that she should, under certain circumstances, have her blood contaminated, exhibiting a veritable toxæmia. At the same time, I do not doubt that many other influences, such as cold, a protracted or instrumental delivery, injury to the parts, &c., will cause crural phlebitis, which may result in the production of phlegmasia dolens.

I cannot myself see much force in the position assumed by Dr. Mackenzie, that "crural phlebitis, in a pure and uncomplicated form, cannot give rise to all the local and general phenomena of the disease, and, therefore, cannot be its proximate cause." My own opinion is—and this opinion is founded on clinical experience—that although crural phlebitis is undoubtedly an essential element of phlegmasia dolens, yet it by no means follows that this latter affection will necessarily succeed every case of phlebotic inflammation; and, on the other hand, I am quite confident that I have observed examples of phlegmasia dolens developing itself as the consequence of a "pure and uncomplicated form" of crural phlebitis.

Synonyms.—Phlegmasia Dolens has been described under a variety of names, depending on the peculiar pathological view entertained by different authors. The following brief summary will fairly exhibit its varied nomenclature: Mauriceau called it *swelling of the leg of the puerperal woman*; Puzos and Levret, *milky deposit, milky engorgement*; Callisen, *œdema puerperarum*; White, *phlegmasia alba dolens puerperarum*; Good, *spargosis puerperarum*; Young, *ecphyma œdematium*; Robert Lee, *phlebitis cruralis*; Rayer, *hydrophlegmasia of the cellular tissue of the inferior extremities*; Duparcque, *lymphatic, painful and leucophlegmasia*. It has received, in addition, the following designations: *œdema lactium, phlegmasia lactea, anasarca serosa, swelled leg, white leg, milk leg*.

Causes.—Among the causes of *phlegmasia dolens* may be enumerated—exposure to cold and dampness, errors of diet, too soon getting up after delivery; and there can be no doubt, that rude manipulations on the part of the accoucheur, instrumental delivery, a protracted labor during which the organs have undergone undue pressure, and the artificial extraction of the placenta, may be mentioned as among the predisposing causes of the affection.

Symptoms.—The symptoms which usually characterize this disease cannot be said to be uniform, while they are ordinarily coincident with those of iliac and crural phlebitis. In the first place, the first indication of trouble may be a chill of more or less duration. Again, the first development of the disease will be a local pain on one or other side of the pelvis. It may be said that *pain* is one of the most constant symptoms of phlegmasia dolens, but it will vary in its type, severity, and seat; sometimes superficial, extremely acute and lancinating; at other times dull and deep-seated. It may be felt in the entire limb, or be confined to one portion only. It will usually commence in the groin, and extend downwards in the direction of the affected limb. Again, the first evidence of the malady will be an acute pain in the calf of the leg; when this occurs it will generally be observed that the swelling, a constant element of the disease, will commence at this point, or at the foot, and gradually travel up the leg and thigh. There is one circumstance which may be regarded as pathognomonic of phlegmasia dolens when it attacks the thigh, and it is this—*The finger can distinctly trace the femoral vein from the groin as it courses down the thigh; it imparts a sensation of hardness, and rolls, as it were, under the finger like a cord.** Pressure upon this vein occasions very intense suffering, whilst pressure on other portions of the limb is ordinarily accompanied by little or no sensibility. The pain of phlegmasia dolens is occasioned by inflammation of the venous trunks, and it is worthy of remark that the pain follows very exactly in the direction of the inflamed vessels. The extension of the limb will increase the suffering, and hence the patient of her own accord usually places it in a state of semi-flexion, and requests that it may be retained in this position by means of a pillow. The pain, under ordinary circumstances, is most acute during the first two or three days. It usually precedes the œdema; and yet there will sometimes be a simultaneous development of the two phenomena.

The swelling or œdema of the limb, like the pain, is a uniform accompaniment of the disease. The general rule is that it appears first at that portion of the affected extremity at which the pain is originally experienced; this, however, is not always so, for it will occasionally be observed at some remote part of the limb distant from the seat of suffering, but always between this latter and the ultimate venous ramifications. It must, however, be remembered

* The fact of feeling this cord is conclusive evidence of inflammation of the vein, and at the same time of the coagulation of the blood within the coats of the vessel. M. Luzol mentions, as an exceptional circumstance (*Journal des Progrès*, t. xiv.) a remarkable fact, and cites an example in illustration—that nearly all the veins of the affected limb may become hard and knotty, presenting the peculiar feel of a cord.

that no matter where the œdema first appears, it soon involves the entire extremity. Its progress is almost always from the first seat of pain towards the lower portion of the limb. At times the swelling is enormous, giving to the affected extremity a volume twice the size of the other; at this period the integuments undergo extraordinary tension; they present a more or less glistening transparency, and assume a marked white color. In consequence of the extreme tension of the parts, the finger will not pit them on pressure; and it is not until the lapse of some days, when the tissues become more relaxed, that the impression of the finger becomes visible. There is, as a general rule, a decided diminution in the size of the limb after twelve or fifteen days. The engorgement, when excessive, may be much lessened by slight apertures made with the lancet, as in other examples of œdematous swellings. Occasionally there will be observed, on the white and glistening surface of the extremity, reddish bands or spots running along the course of the inflamed vessels; sometimes, in lieu of these, there will be seen vesicles of a dark or blackish hue.

Conjoined to the local symptoms, just described, may be mentioned certain constitutional disturbances more or less incident to the affection. For example, the pulse will become accelerated, varying from 100 to 140 and upwards; the tongue coated, with oftentimes marked thirst; countenance usually pale; the bowels sometimes torpid, at other times diarrhœa will supervene; loss of appetite, and derangement of the urinary secretion, the latter being ordinarily dark colored and turbid. The patient is irritable and restless. Sometimes the skin is dry and burning; again it will be covered with perspiration. Should the disease occur during pregnancy, as will sometimes happen, there will be a diminished secretion of milk, and the breasts will become notably lessened, unless the malady should be of short duration. The lochial discharge is neither so constantly diminished or suppressed as would naturally be inferred would be the case.

Why is œdema a symptom of Phlegmasia Dolens?—This is an interesting inquiry, and is readily explained. Anasarca, or œdema, is an infiltration of serum or the watery element of the blood into the cellular tissue, and represents, therefore, one of the numerous forms of dropsical effusion. There are various causes of anasarcaous engorgements, such as disease of the liver, kidney, heart, etc., but of the pathology of these organs, and its consequences, it is not my purpose to speak at present. I shall limit myself to the solution of the simple inquiry—*Why is anasarca the uniform accompaniment of phlegmasia dolens?* The answer to this interrogatory is, in my opinion, conclusive evidence of what has already been stated, viz. that the pathology of phlegmasia dolens is an iliac or crural phlebitis. Anasarca, then, accompanies phleg-

masia dolens because of venous obstruction, the obstruction in this special case depending upon the blocking up or occlusion of one or more of the veins of the affected limb, as the result of inflammation. Let us examine this point a little in detail. It has been shown, I think, very conclusively, that one of the attributes of the venous system is its power of absorbing fluids; and it has been demonstrated that fluid substances may pass into and out of the veins, through the process of transudation or imbibition. But this physical act—imbibition or transudation—requires for its accomplishment a certain condition of the veins; for example, if these latter be greatly distended with watery fluid, the further entrance of this material will be prevented; and when the vessels reach a maximum point of distension, the watery element of the blood will, through *exosmosis*, pass out through the coats of the engorged veins. Thus it will be seen that excessive plenitude of the veins will necessarily result in an effusion of fluid; and it must also be recollected that this fulness of the vessels is almost invariably induced by an obstacle to the free passage of the blood through the veins to the heart. In *phlegmasia dolens*, as has already been remarked, the femoral and iliac veins becoming the seat of inflammation are occluded, thus necessarily obstructing the circulation of the blood in these vessels; and this, therefore, is the true explanation of the relation which is found to subsist between *phlegmasia dolens* and *anasarca*.

As early as the sixteenth century, Dr. Lower* satisfactorily established by experiments on living animals that an obstacle to the circulation of the blood through the veins would result in the effusion of serum. He placed a ligature around the ascending vena cava of a live dog, and then closed the wound; the animal soon became exhausted, and died in a few hours. The post-mortem examination revealed a large accumulation in the abdomen of a serous fluid similar to what would be observed in *ascites*. In another dog, he tied the jugular veins; after some hours, all the parts situated below the ligatures became very much tumefied; in two days the animal died as if from suffocation. In this case, also, a collection of serum was observed in the parts above the ligatures. I might likewise cite Boerhaave and his illustrious commentator Van Swieten,† Hoffman,‡ Morgagni,§ Cullen,|| and others, in confirmation of the same view.

Majendie, it may be here observed, was one of the strongest advocates of venous absorption. His experiments, quite conclusive

* De corde, item de motu et calore sanguinis, etc. Cap. ii., p. 123, et sequent.

† Van Swieten's Commentaries, t. iv., p. 186 et seq., 1770.

‡ Med. Prat., t. iv., cap. xiv., p. 431.

§ De sed. et caus. morb., epist. 38, § 19.

|| Elements of Practice, t. ii., p. 556, 1787.

in themselves, was the starting-point, if I may so term it, of numerous learned researches on this and kindred questions. M. Bouillaud,* in 1823, wrote as follows: "I shall now speak of those dropsical effusions, reputed passive, and shall endeavor to prove, by facts and observations, that they all result from obstruction of some sort in the venous circulation; and, in a great number of instances, the obstruction consists in the occlusion of the veins of the part which is the seat of the dropsy." Andral,† too, has recorded his testimony in very positive terms of the relation between serous infiltration and venous obstruction.

Which of the Inferior Extremities is most frequently the Seat of Phlegmasia Dolens?—It is well shown by statistics that the left limb is more frequently attacked than the right; at the same time, it should be stated that sometimes both limbs become involved. This latter circumstance, however, is comparatively rare. Various theories have been suggested in explanation of the preference exhibited by the affection for the left extremity—such as the greater frequency of the position of the occiput of the fœtus to the left; the greater frequency of the attachment of the placenta to the left side of the uterus;‡ the tendency of the female to rest on the left side rather than on the right side. One or other of these circumstances, or all of them conjoined, may or may not be the true cause, but further observation, I think, is needed to decide the question. Admitting, however, that this is really the explanation, I do not see that science can be much benefited by it, for, with the exception of correcting the disposition to recline on the left rather than on the right side, nothing could be done to avert the more frequent occurrence of the disease in the left extremity, and, indeed, if this could be accomplished, I can perceive no possible advantage derivable from it; for whether phlegmasia dolens attack the right or left limb, the progress of the affection, its phenomena, and therapeutics are identical.

At what period after labor does the disease usually occur?—From the most accurate information on this subject, it would seem that there is nothing positive; the affection may present itself from the first to the thirty-fifth day; but, as a general rule, it will be found to appear not later than three weeks from the time of parturition, although there are exceptional cases in which it has not manifested itself until the lapse of two months.

* Arch. gen. de Med., t. ii., p. 188 et seq.

† Précis d'Anat. Path., t. i., p. 328.

‡ M. Naegelè, Jr., has proved, from his researches on the subject that the placenta is situated most commonly on the left surface of the uterus. For an account of these researches, as well as those of Dr. Von Ritgen, on the same subject, see page 373 of this volume. It may also be stated that Dr. Carrière, of Strasburg, records that in sixty-six cases in which the placental sound was detected, it was heard on the left side of the uterus in thirty-eight, and on the right in twenty-eight cases.

Frequency of Phlegmasia Dolens.—This disease cannot be said to be of common occurrence. The best observers will, I think, concur in the following statistics gathered by M. Raige Delorme, as presenting a fair approximation to the facts touching this point.* In 1,897 females delivered in the Westminster Dispensary, White observed the disease five times; in 8,000 confinements in his own practice, and at the Manchester Hospital, there were but four cases of the disease. Again, in 900 deliveries, Wyer records five cases; in 1897, Bland five cases; in 200, Sankey one case; in a practice of 26 years, Siebold has met with it five times; Struve fifteen times in 18 years; Robert Lee 28 times in six years. With an extended field of observation, I find but three cases of phlegmasia dolens recorded in my note-book, and two of these occurred in consultation, one with Dr. Philips of Harlaem, the other with Dr. Forbes of Brooklyn.

Diagnosis.—The diagnosis of phlegmasia dolens is not difficult. There are certain evidences of this disease, which cannot readily be mistaken—such as the pain along the vessels of the limb, the œdema, and especially the *hard cord felt by the finger as it presses on the inflamed vein*. Sometimes, however, it may be difficult to reach the inflamed vessel, and this may arise from one of two circumstances—either because of the excessive engorgement of the part, or the profound position of the affected vein. But even in these events there can be no embarrassment; for the progress of the symptoms, and the particular nature of the œdema, will broadly indicate the affection. It may not be altogether unimportant to remark, that the anasarca swelling of the limb may possibly be mistaken for the œdema symptomatic of disease of the liver, heart, or kidneys. But an error of this kind would disclose great carelessness on the part of the medical man. In these latter cases, for example, there would have been previous indications of disease of these organs; and, in addition, a proper local examination would disclose derangement in them, either functional or organic.

Prognosis.—*Phlegmasia Dolens* is not, as a general rule, a grave affection, and it may, therefore, be said to terminate favorably; when it destroys life, it does so through some of the more serious complications, which occasionally develop themselves in the progress of the disease.

Progress, Duration, and Termination.—The febrile excitement, together with the pain and œdema, so characteristic of the disease, become gradually diminished. The pain subsides first; but the swelling continues more or less stationary from three to six weeks, and, under some circumstances, for a much longer period. Occasionally, however, when the disease is slight, the swelling will dis-

* Compend. de Médecine Pratique, T. Sixième, p. 471.

appear from twenty-four to forty-eight hours. As soon as the size of the limb begins sensibly to diminish, the tension is correspondingly less, and the impression of the finger on the surface much more evident. It will sometimes happen that the two extremities will become successively the seat of the disease, and precisely the same phenomena will present themselves as at the commencement of the attack. The usual termination of *phlegmasia dolens* is in resolution, which commences with the cessation of pain, and a diminished size of the limb. But it should be recollected that this yielding of the symptoms will sometimes be promptly followed by a return of the pain and œdema, from error of diet, exposure to cold, or too early getting up. While resolution is progressing, an interesting change often takes place in the superficial veins of the limb; they become more or less distended with blood, showing that a new collateral circulation is going on. M. Duplay* was, I believe, the first to direct attention to this latter fact.

The disease will sometimes lapse into a chronic state; the extremity then becomes enormously enlarged, the surface is hard and irregular, and looks not unlike elephantiasis. Indeed, in some females the extremity does not resume its natural size for months, and even years.

It should also be mentioned that the affected limb will occasionally become the seat of abscesses, and these may be single or multiple; they may develop themselves in the subcutaneous or in the sub-aponeurotic cellular tissue; hence they will be superficial or deep-seated. In the latter case, the abscesses will frequently prove mischievous. Other complications may ensue, such as peritonitis, metro-peritonitis, ascites, etc. These latter, however, cannot be regarded as the veritable accompaniments or sequelæ of *phlegmasia dolens*.

Treatment.—This will be modified by two circumstances, which should be constantly borne in mind—the activity of the attack, and the constitution of the patient. If the pain and febrile excitement be severe, and the system plethoric, a dozen or more leeches may be applied, with signal advantage, to the groin, and over the inflamed femoral vein; these should be followed by warm poultices for the purpose of promoting the bleeding. The leeches may be repeated two or three times, in smaller number, depending on the indication which may present. Cathartics, unless there be diarrhœa, are especially proper. Commence with:

R Hydrarg. c. creta gr. xij.

followed by two wine glasses of the following saline mixture every four or six hours, until free purgation is accomplished:

* Dict. de Méd., Art. Phleg. Dolens, 2d ed., p. 247.

R Sulphat. magnesiae,
 Sup. tart. potassæ, aa ℥ i.
 Aquæ destillatæ Oj.
 Ft. Sol.

If there be evidences of sluggish liver with dry skin, it will be proper to administer occasional doses of calomel with antimony or Dover's powder—say gr. ii. of calomel with gr. ¼ of antimony, or gr. iv. of Dover's powder. It is very important to relieve the patient of pain, and procure her comfortable sleep. For this purpose a table-spoonful of the following may be given every half hour until the object is attained :

R Syrup. papav. ℥ ʒj.
 Mucil. acaciæ ℥ ʒij.
 Sol. sulph. morphinæ (Majend.) gtt. xlii. M.

When the limb is much engorged, great care should be observed in promoting a free secretion of urine ; for this purpose let cremor tartar water be freely taken as a drink ; or the nitrate of potash given, gr. xv. in a tumbler of water or thin gruel, twice or thrice a day. The diet to be bland, and the most perfect rest enjoined, with the limb slightly raised from the plane of the body ; the nurse should be directed to protect the part from contact with the bed-clothes, which may be accomplished by means of a cradle. After the leeching and purging, marked benefit will oftentimes ensue from the application of small blisters, repeated according to circumstances, not to the thigh, but to either the internal or external malleolus. I have great faith in the derivative action of blisters thus applied in the acute stage of *phlegmasia dolens*. If the vital forces become depressed, quinine, together with a nutritious diet, will be indicated.

One word with regard to local applications, after the inflammatory state has passed, for the purpose of soothing pain. A warm bran poultice will sometimes give much relief—wrapping the limb in flannel, secured by oil silk ; the extract of belladonna smeared over the painful portion of the extremity ; gentle friction with laudanum and sweet oil, camphorated oil, or soap liniment ; and if the surface preserve its integrity, a good local application will be equal parts of chloroform and olive oil.

It may here be mentioned that when the œdema is excessive, relief will be afforded by slight punctures, thus, through the escape of the serum, diminishing the tension, and consequently mitigating the pain. In the event of purulent collections, either superficial or profound, they are to be treated on general principles.

LECTURE XLVII.

Etherization—Its Importance; Anaesthesia—meaning of the Term—Anaesthetics in Midwifery of Recent Discovery—in Surgery, of Ancient Date; The Anaesthetic Agents now in use—Sulphuric Ether, Chloroform, and Amylene—Sulphuric Ether first employed as an Anaesthetic by Dr. Morton; in Parturition, by Prof. Simpson; its first trial in America, in Labor, by Dr. Keep, of Boston—Chloroform; its Introduction by Prof. Simpson; Amylene; Dr. Snow—Comparative Safety of Sulphuric Ether, Chloroform, and Amylene—Cardiac Syncope and Paralysis of the Heart from Chloroform—Indications for the use of Anaesthetics in Parturition—Should they be employed in Natural Labor?—Their value in Instrumental and Manual Delivery—Anaesthetics in Infancy—Influence of Etherization on Contractions of the Uterus; on Mother and Child—Flourens on the Nervous System in Etherization—Time and Mode of resorting to Anaesthetics in Parturition—The Pulse; how affected by Etherization—Relaxing Effects of Etherization—Case in Illustration.

GENTLEMEN—It must be universally conceded that the contribution which science has made to suffering humanity—anaesthesia, or insensibility to pain—whether under the surgeon's knife, or during the throes of labor, should be regarded as among the most sterling offerings of the human mind. The term anaesthesia, in our day, is employed to designate a partial or positive unconsciousness through the administration of what are known as anaesthetics—more especially ether and chloroform. But while employed in this sense, it is well to recollect that the true signification of the word is a loss or privation of feeling. Although the introduction of anaesthetic agents into the lying-in chamber for the purpose of diminishing the anguish of the parturient woman, is of recent origin, yet the idea and actual practice of having recourse to certain agents with the view of preventing suffering under surgical operations is of very ancient date. You will read, for example, in the older Greek and Roman authors, minute directions for the administration of their favorite mandragora as the great remedy for soothing pain; while, again, among the Chinese, the Indian hemp seemed to possess superior anaesthetic charms. I do not propose, however, either to discuss in detail, or enter into the history of the interesting question of anaesthetics. I desire simply to present some general remarks touching their origin, employment, and results, during the progress of parturition; with this view, I shall endeavor to indicate under what circumstances, in my judgment, etherization or anaesthesia will be a justifiable resort. It is needless to remind you that the

first introduction of these agents into the lying-in room was very generally hailed by what may be properly denominated a wild enthusiasm; and, as too often happens in the advent of new remedies, there was more zeal than judgment displayed in their administration. Hence, with some practitioners, anæsthetics were had recourse to in every case of labor; the one idea seemed to prevail—the accomplishment of *child-birth without pain*. With such an unrestricted and indiscriminate employment of these agents, two consequences were inevitable, viz. their abuse, and to a degree, loss of confidence in their virtues.

The Anæsthetics now in Use.—The anæsthetic agents which have received more or less the sanction of the profession are: 1. *Sulphuric Ether*; 2. *Chloroform*; 3. *Amylene*. It may not be out of place very briefly to allude to each of these substances.

1. *Sulphuric Ether*.—Without intending to take any part in the controversy as to whom is due the credit of suggesting the anæsthetic properties of sulphuric ether—whether it be Dr. Horace Wells, Dr. W. T. G. Morton, or Dr. Charles T. Jackson,* all countrymen of ours—it is, I think, universally admitted that the original administration of ether to prevent the pain of an operation was by Dr. Morton; this occurred on the 30th of Sept. 1846, the ether being administered, by inhalation, to a man from whom Dr. Morton extracted a tooth without causing the slightest pain. Prof. Simpson was the first to resort to this agent in parturition, which he did on the 19th of Jan., 1847, and became satisfied of its anæsthetic properties without its interfering with the parturient effort. In our own country, sulphuric ether was administered for the first time in labor, April 7th, 1847, by N. C. Keep, M.D., † of Boston, with most satisfactory results. It is an interesting fact that sulphuric ether was given, by inhalation, both in surgery and midwifery, for a period of several months in America and in Europe, previously to the introduction of chloroform; and, as far as I have been enabled to ascertain, not a single fatal case had occurred under its administration. It was, if I may so term it, not only in good repute, but had gained the very general confidence of the profession both here and abroad, until, as we shall presently see, the force of circumstances caused it measurably to give place to another anæsthetic—chloroform.

2. *Chloroform*.—When sulphuric ether had been tested, and its anæsthetic properties most satisfactorily demonstrated, anxious for something still better, which would be free from certain sup-

* The reader may be interested in a perusal of "A Defence of Dr. Charles T. Jackson's claims to the Discovery of Etherization." Boston, 1848.

† A report of the case will be found in the Boston Medical and Surgical Journal, April 14th, 1847.

posed objections, the untiring mind of Prof. Simpson, always in the pursuit of truth and improvement, developed the fact that chloroform possessed in a marked degree anæsthetic virtues. The learned Professor subjected his own person to experiments, with a view of testing the value of the new agent; the reader will be more than amused with the graphic description by Prof. Miller, of the scene, which ensued in Dr. Simpson's dining-room, when he and his two friends, Drs. Duncan and Keith, had placed themselves under the influence of chloroform.* The personal experiments with this substance were most satisfactory to the gentlemen, who had submitted themselves to its influence; and the result was a paper from Prof. Simpson,† which although it provoked controversy, soon gave popularity to the new agent in the lying-in chamber, and, in a measure, caused its adoption as a substitute for sulphuric ether. One of the very first to have recourse to chloroform after the publication of Prof. Simpson's paper, was Prof. Murphy,‡ of the London University—it was most successful in his hands, and he is since entitled to be ranked among its warmest advocates.

3. *Amylene*.—We are indebted for the discovery of this substance to M. Balard,§ Prof. of Chemistry in Paris, who brought it to the attention of the profession in 1844; and to Dr. John Snow,|| is due the credit of having been the first to employ amylené as an anæsthetic, which he did in Kings College Hospital, in Nov. 1856. He made several experiments on animals, and inhaled small quantities of it himself. Dr. Snow, after resorting to it in a number of operations, believes it to possess certain advantages over chloroform in many cases. Although it has not as yet been generally employed either in America or Great Britain, it has been extensively used, with favorable results, in Paris, Strasburg, and other places on the Continent.

Comparative Safety of Sulphuric Ether, Chloroform, and Amylene.—On this question, more particularly in reference to the two former agents, the opinion of the profession is divided. The fact, however, is very certain, that the statistics derived from the administration of the two substances preponderate greatly in favor of sulphuric ether, as a safe and reliable anæsthetic. When chloroform destroys life, it would appear, from an analysis of the recorded fatal cases, that it does so through a peculiar influence exercised on the heart's action—a cardiac syncope, or what has been designated a paralysis of the organ. On the other hand, it has been satisfacto-

* Surgical Experience of Chloroform, by Prof. Miller, pp. 10, 11.

† An Account of a New Anæsthetic Agent as a Substitute for Sulphuric Ether in Midwifery and Surgery, by J. Y. Simpson, M.D. Edin. 1847.

‡ Chloroform in Child-birth, by Edward Wm. Murphy, M.D., 1855.

§ Annales de Chimie et de Physique, tom. xii., p. 320.

|| On Chloroform and other Anæsthetics, by John Snow, M.D. London, 1858.

rily shown by experiments on animals, by Dr. Snow* and others, that sulphuric ether is incapable of producing sudden death by stoppage of the heart's action.

As for myself, I have some time since abandoned the use of chloroform, and have recourse exclusively to sulphuric ether, which I have always found safe and reliable. I have had no experience with amylene, yet it has received very high commendation from those who have tested it. Dr. Snow has employed it in seven cases of labor with the most entire satisfaction; and he says "the great case with which it can be breathed, owing to its entire want of pungency, is a decided advantage it possesses over both ether and chloroform." With such testimony in its favor, it is not unreasonable to believe that it is destined to occupy an important place among the anæsthetic agents.†

The Indications for Anæsthesia in Parturition.—In reference to the particular circumstances justifying the use of anæsthesia in the lying-in room, there is no concurrence of opinion among accoucheurs; on the contrary, there is much diversity of sentiment. With some it is the universal habit in every case of labor, no matter how natural and auspicious it may promise to be, to resort at once either to sulphuric ether or chloroform. This, it seems to me, is really abusing a good thing. Labor is unquestionably a natural process—it is, indeed, entitled to be designated in strict physiological language a function. If this be so, is it right to interfere with a function, properly so called, as long as its exercise is normal, and within the true record of nature? I think not. Again, there is another argument, which has always struck me with force, why anæsthesia should not be employed in a natural parturition, and it is this—the female, at the most interesting period of her life—the time of labor, should, all other things being equal, have her mind unclouded, her intellect undisturbed, her judgment fully adequate to realize and appreciate the advent of a new and important era in her existence—the birth of her child. Therefore, I shall advise you not to resort to anæsthetics in natural and ordinary labors, except in

* Dr. Snow, in his excellent work already alluded to, records in tabulated form fifty deaths from chloroform, and in all the cases (45) in which the symptoms which occurred at the time of death are reported, there is, he observed, every reason to conclude that death took place by cardiac syncope, or arrest of the action of the heart. In forty of the cases, the symptoms of danger appeared to arise entirely from cardiac syncope, and were not complicated by over-action of the chloroform in the brain. Again, he says, I am aware of only two deaths, which have been recorded as occurring during the administration of ether, and it is not probable that the death in either case was due to the ether. I hold it, therefore, he continues, to be almost impossible that a death from this agent can occur in the hands of a medical man, who applies it with ordinary intelligence and attention. [Op. citat. p. 262.]

† The pupil may consult with advantage, "A Treatise on Etherization in Child-Birth." By Prof. Walter Channing, M.D. Boston, 1848.

the event of certain contingencies which, in the judgment of the accoucheur, would justify their administration. The employment of these agents will be proper in cases of operative midwifery, whether instrumental or manual; in cases of unusual pain accompanying the labor; in instances of rigidity or an unyielding condition of the mouth of the womb, vagina, or perineum; in a woman of excessive nervous irritability; in certain cases of irregular contraction of the uterus, in which the strength of the mother is severely tested without a corresponding progress in the delivery; in many cases of puerperal convulsions, provided there is no tendency to cerebral congestion; in spasmodic contraction of the uterus before the birth of the child, and subsequently to the birth, the placenta being retained by the spasm of the organ. In some conditions of pregnancy—for example, where there is a degree of undue irritability of system, or the hysteric manifestation, or where it becomes necessary to extract a tooth; and I may remind you that I have on several occasions derived marked benefit from the administration of sulphuric ether in cases of rebellious dysmenorrhœa. Let me here add that, in the irritability and convulsions of children,* etherization will oftentimes exhibit the happiest results.

The Influence of Anæsthetics on Uterine Contraction.—One of the original and chief objections to the employment of anæsthetics in midwifery was the apprehension, advanced by some authors, that they so completely controlled the action of the uterus as necessarily to expose the patient to all the hazards consequent upon inertia of the organ—such as hemorrhage, &c.; this, however, is an unfounded apprehension. It is a curious fact that, in some instances, the activity of the uterus will occasionally become increased under the influence of these agents; and in many cases, there will be no perceptible influence exercised either as to the force or regularity of the contractions. It is, however, true that when anæsthesia is carried to its maximum—causing a state of complete unconsciousness, there will oftentimes be a suspension of the labor, the uterus resuming its wonted efforts as soon as the full effects begin to yield. Individual idiosyncrasy has frequently a controlling influence on the result of the anæsthetic; in some instances a very slight degree of etherization will suffice to afford relief, and again insensibility to suffering will not ensue except under full unconsciousness.

* I have repeatedly had resort to etherization in children, and always with good effect. Dr. Snow's experience is amply confirmatory of its safety and efficiency in these cases. He says "he has given chloroform in a few instances as early as the age of eight and ten days, and in a considerable number before the age of two months; he has administered it to 186 infants under a year old; nor has he experienced any ill effects from it either in these cases, or in those of children more advanced in life; it is, also, worthy of remark that none of the accidents from chloroform, which have been recorded, have occurred to young children." (p. 49.)

The secondary forces in parturition—the contraction of the diaphragm and respiratory muscles—would necessarily be interfered with if, under the operation of anæsthesia, the sensitive nerves should become deprived of their special function—sensibility to impressions—for in this case reflex movement could not be accomplished.

The following are the conclusions of M. Flourens* touching the influence of anæsthetics, under gradual inhalation, on the nervous system, and they are not without interest: “Under their action, the nervous centres lose their powers in regular succession; first the cerebral lobes lose theirs, viz. the intellect; next the cerebellum is deprived of its, viz. the controlling of locomotion; next the spinal cord loses its function of sensitiveness and motion; the medulla oblongata, however, still retains its functions, and, therefore, the animal lives; with the loss of power in the medulla oblongata, life becomes extinct.”

The Influence of Anæsthetics on the Safety of the Mother and Child.—Under judicious administration, it may be affirmed that, as a general rule, these agents may be employed during parturition, with safety to both mother and child.

Time and Mode of Etherization.—As has already been remarked, some accoucheurs have recourse to etherization in nearly every case of natural labor, and, to be consistent, I suppose, they commence it simultaneously with the advent of the pains. We will, however, imagine that you will resort to it, under ordinary circumstances, only in cases of exaggerated suffering; and, therefore, as a general rule, this will manifest itself after the os uteri is so far dilated as to bring into play a positive tributary or nervous force, imparting to the uterine contractions a well-defined expulsive character. If, therefore, etherization be judged advisable, the necessity for a resort to it will usually exhibit itself at this stage of the labor. As a general principle, it will not be necessary to cause full etherization, the object being merely to lessen the amount of suffering; therefore, in such cases, unconsciousness is not called for; all that is needed is to produce diminished sensibility. It is proper, whether sulphuric ether or chloroform be used, to employ it at the time of a pain, and suspend it during the interval of contraction. Many contrivances have been suggested, under the term inhalers, for the purpose of accomplishing the object in view. But it seems to me, the plan originally proposed by Prof. Simpson will answer every purpose. Take a delicate hollow sponge, or a handkerchief, funnel shape, and, if chloroform be used, throw upon the sponge or handkerchief, a small quantity of the fluid (say fifteen to twenty-five minims). This should be applied to the nose and mouth of the

* Gazette des Hôpitaux, 20 Mars, 1842.

patient, with the request that she will inhale it. In a very short time its effects will become apparent in occasioning partial insensibility. This may be repeated, if necessary, on the recurrence of each pain. In cases, however, in which instrumental or manual delivery is to be accomplished, the patient should, previously to the introduction either of the instrument or hand, be put into a state of unconsciousness? When the instrument has been properly applied, the anæsthetic should, for a time, be suspended, in order that the delivery may be benefited by the contractions of the organ; but, if there be delay in bringing the child into the world, the chloroform may again be had recourse to with the view of controlling the sensibility to pain.* Although it is proper to commence with a small quantity of the chloroform, yet, in protracted labors, it may become necessary to consume several ounces.

It is well to mention, in connexion with the administration of chloroform, that it is apt to produce nausea and vomiting, and, therefore, care should be taken to administer it before and not after a meal.

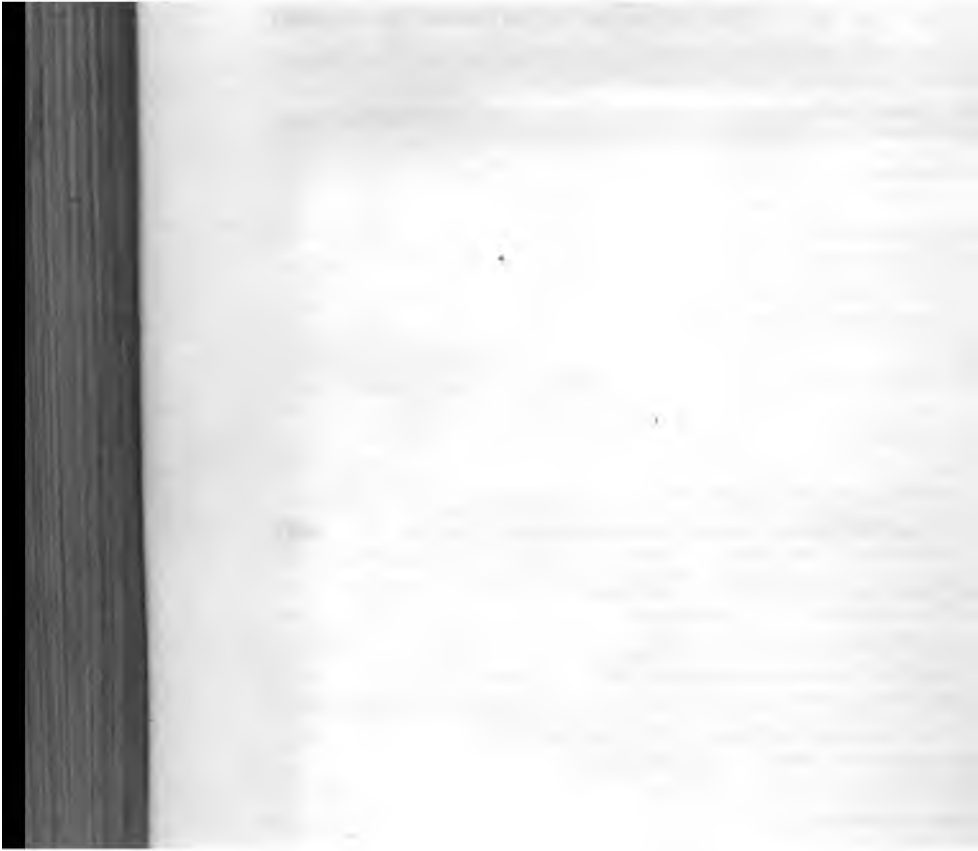
If sulphuric ether be employed, it can be administered in much larger quantity—a fluid ounce may be poured into the sponge or handkerchief, and inhaled.

The Influence of Anæsthetics on the Pulse.—If care be taken to watch the pulse, it will be found that usually it increases both in force and frequency at the commencement of the inhalation. On the contrary, when insensibility is accomplished, it generally resumes its normal standard. If the patient have suffered from loss of blood, and also in cases of nausea or vomiting, the pulse will lose its force and frequency; but with these exceptions it is rare to observe the latter changes in the throes of the heart under the administration of anæsthetic agents.

Relaxing Effects of Anæsthetics.—I have often observed in practice the influence of etherization in producing relaxation, and this attribute is manifest in other instances than in parturition. I had a short time since a striking illustration of the fact: Dr. Francis Fleet, of this city, requested me to visit in consultation a young lady, aged nineteen years, who had never menstruated, and who, before placing herself under his care, had been subjected to a variety of emmenagogues, with a view of establishing the catamenial function, but all without avail. The Doctor, on making an examination, discovered that, commencing about an inch from the vulva, there was an occlusion of the vagina. The passage was

* Let it be distinctly understood that, in cases of version, the unconsciousness of the patient should be maintained until the accoucheur has succeeded in grasping the feet, and bringing them down to the superior strait. At this stage of the labor the anæsthetic should be suspended, for here it is important to have the advantage of the contractions of the uterus for the purpose of expediting the delivery.

obstructed by a dense fibrous band. On introducing my finger, I recognised extraordinary sensibility of the parts together with unusual rigidity. The patient was placed under the influence of ether, which acted promptly in overcoming both the sensitiveness and rigidity. At the Doctor's request, I divided, with a bistoury, the membranous band, which immediately brought the os uteri within the feel of the finger. The menstrual blood, which had been accumulating for some time, but which had found no exit because of the obstruction, flowed freely; and the young lady was soon repaid for her fortitude by taking to her bosom her affianced lover.



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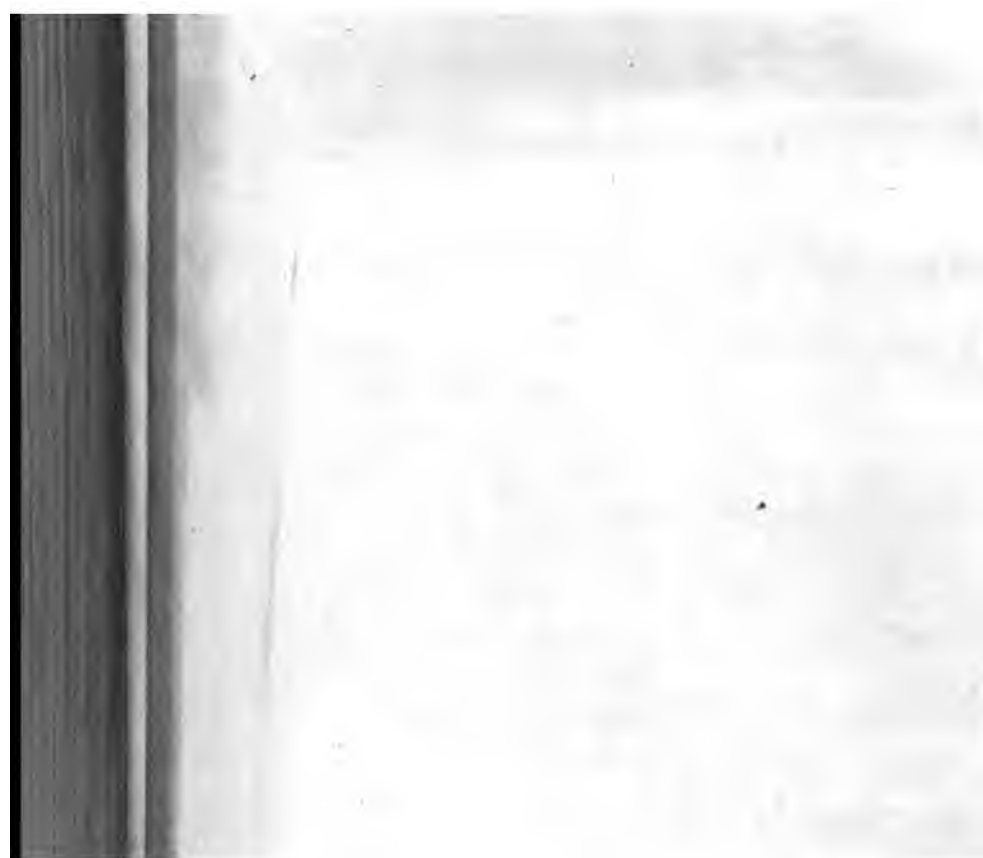
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